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Report on a Rat-flea Survey of San Juan, P. R.

Sedimentation Period and Bacterial Efficiency of Preliminary Water Treatment

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PUBLIC HEALTH REPORTS

VOL. 45 JULY 4, 1930 NO. 27

THIRD REPORT ON A RAT-FLEA SURVEY OF THE CITY OF SAN JUAN, PORTO RICO[1]

By A. L. Carrión, M. D., *Chief of the Bureau of Plague Prevention, Department of Health of Porto Rico*

During the third and last year of this survey (from July 1, 1928, to June 30, 1929) cage traps were set on an average in 39 localities every day at the rate of 5.5 traps to each locality. Rats were caught in 1.4 per cent of the premises. It has been estimated that, on an average, 3.2 rodents were captured per 1,000 traps distributed. According to these data, the rat infestation of the city appears to have been lower than in the two preceding years.

Among the 249 live rats captured, 218 were adults, 10 were partially grown, and 21 were young. There were 112 males and 137 females, 34, or 24.8 per cent, of which were found pregnant, bearing an average of 6.6 foeti each. The highest number of foeti found in any one rat was 11.

The following table shows the relative concentration of the species in the various zones of the city:

Table 1.—*Comparative concentration of the species in different zones—Numbers of traps set and rats captured*

	Zone			
	1	2	3	4
Total traps set	38, 560	8, 095	16, 187	15, 694
Total rats captured	93	28	60	68
Average number of rats per 1,000 traps set	2. 4	3. 5	3. 7	4. 3

Evidently, the vermin this year have been more uniformly distributed throughout the town. The great drop of the rat index in Zones 2 and 4, as compared with the two preceding years, is especially notable.

Mus norvegicus, as was expected from our previous experience, has been by far the prevailing rodent. (See Table 2.) Chart 1 shows the incidence of the different species in the various zones.

Fleas were collected from 68 per cent of the rats captured. Their total number for the year was 1,970. Of these, 1.067 were males and 903 females—a ratio of 1.2 to 1. Zone 1 (docks) furnished the highest number—1,065. Zone 3 (commercial), Zone 4 (residential), and Zone 2 (water front) followed with 386, 378, and 141 fleas, respectively.

[1] Reprinted from the Porto Rico Journal of Public Health and Tropical Medicine, December, 1929, pp. 158-166.

TABLE 2.—*Monthly classification of rats*

Species	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
Norvegicus	21	27	19	13	13	9	16	8	3	3	5	3	140
Rattus	7	10	3	1	4	1	1	1	6	13	1	1	49
Alexandrinus	3	5	4	3	10	5	8	7	5	2	5	3	60
Total	31	42	26	17	27	15	25	16	14	18	11	7	249

Classification of the insects, though revealing four different species, showed that *Xenopsylla cheopis* continues to be the predominating flea among our rats.

TABLE 3.—*Monthly classification of insects*

Species	Sex	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
Xenopsylla cheopis	M.	92	168	66	15	107	52	30	152	42	172	127	32	1,055
	F.	63	141	65	4	85	42	29	99	40	181	109	12	870
Echidnophaga gallinacea	M.	----	----	----	----	3	----	1	----	----	----	----	1	5
	F.	9	----	----	----	9	----	2	----	----	7	5	2	34
Ctenocephalus canis or felis	M.	1	----	----	----	----	----	----	1	----	----	----	----	2
	F.	----	----	----	----	1	----	----	----	----	----	----	1	2
Pulex irritans	M.	----	----	----	----	----	----	----	----	1	----	----	----	1
	F.	----	----	----	----	----	----	----	----	----	----	1	----	1
Total	----	165	309	131	19	205	94	62	252	83	360	242	48	1,970

The flea index for the year may be expressed as 7.9 fleas per rat, while the cheopis index is 7.7. The highest number of fleas found on a single rat was 111. It was an adult male *rattus* captured at "La Popular" dock (Zone 1) on April 29, 1929. All of these fleas were classed as *Xenopsylla cheopis*.

The following table shows the relative concentration of the insects in the various zones of the city:

TABLE 4.—*Comparative flea infestation in different zones*

	Zone			
	1	2	3	4
Percentage of rats with fleas	78.5	50.0	71.7	57.4
Average number of fleas per rat	11.5	5.0	6.4	5.5

Obviously the docks have been more heavily infested than any other district in San Juan, which is in keeping with our observations of previous years.

The monthly variation of the flea index has been recorded as follows:

TABLE 5.—*Monthly flea indices*

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	For the year
Percentage of rats with fleas	61.3	61.9	57.7	53.0	70.4	60.0	52.0	94.0	71.4	100.0	90.9	85.6	68.0
Average number of fleas per rat	5.3	7.4	5.0	1.1	7.6	6.3	2.5	15.8	5.9	20.0	22.0	6.9	7.9

It would seem that the cyclone of San Felipe had washed off most of the fleas from the locality. Indeed the indices for the months immediately following the disaster represent the lowest figures recorded during the three years. After a short period, however, the

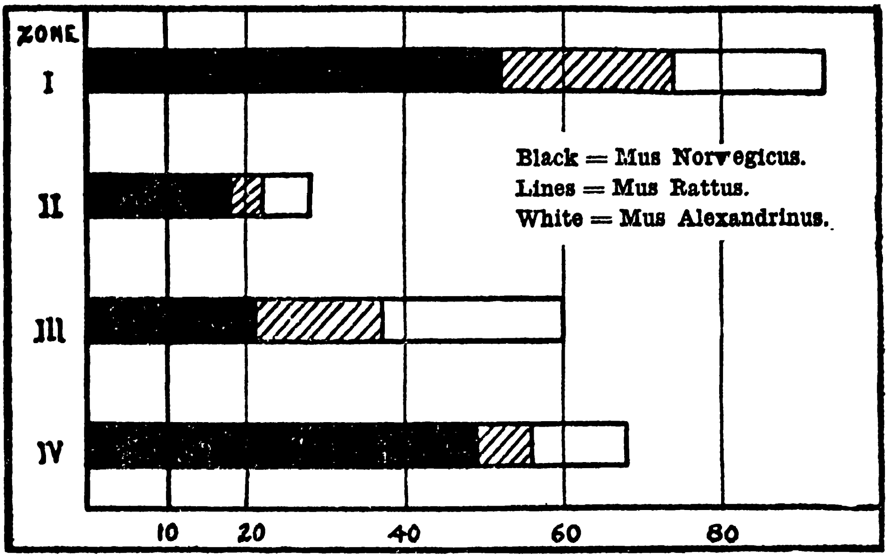

CHART 1.—Number of rats captured in each of four zones

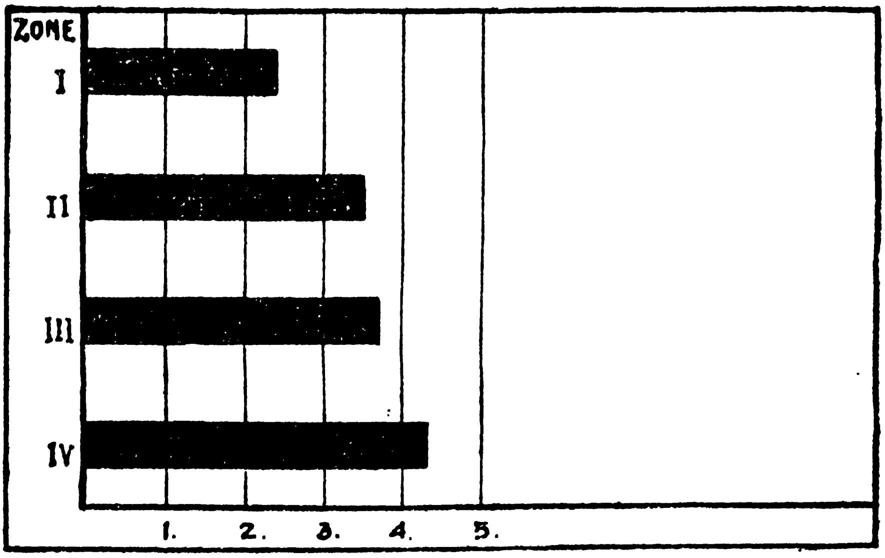

CHART 2.—Proportional concentration of rats in four zones (average number of rats captured per 1,000 traps set)

insects appeared to be more plentiful than ever, the months of April and May showing the highest indices noted by us—20 and 22, respectively.

The comparative flea infestation among the three species of rats is given in Table 6.

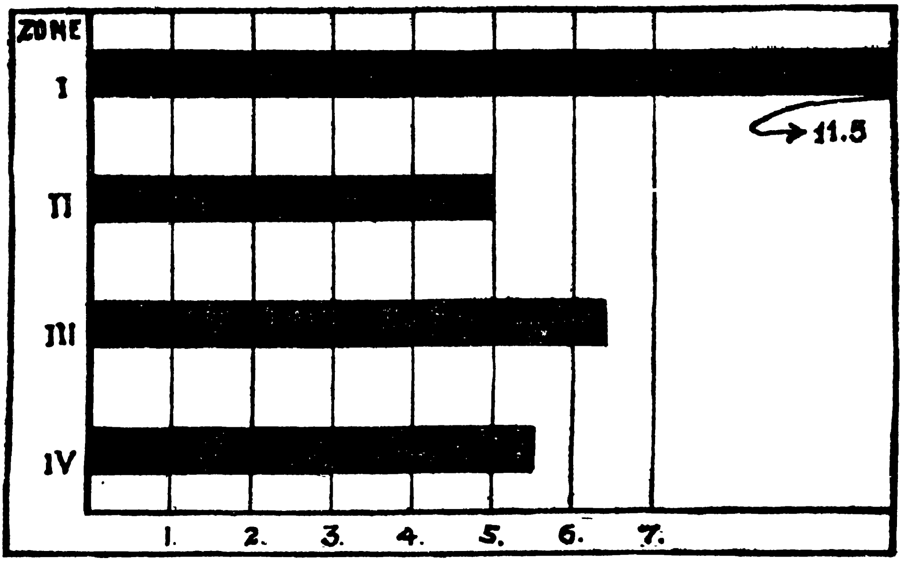

CHART 3.—Flea index in different zones

TABLE 6.—*Flea infestation among various species of rats*

	Decumanus	Rattus	Alexandrinus	Total
Total rats captured	140	49	60	249
Total fleas in each species	947	458	565	1,970
Percentage of rats having fleas	57.1	75.5	86.7	68.0
Average number of fleas per rat	6.8	9.3	9.4	7.9
Average number of fleas per rat last year	5.2	7.1	13.3	6.6
Average number of fleas per rat year before last	7.3	8.6	4.0	7.2

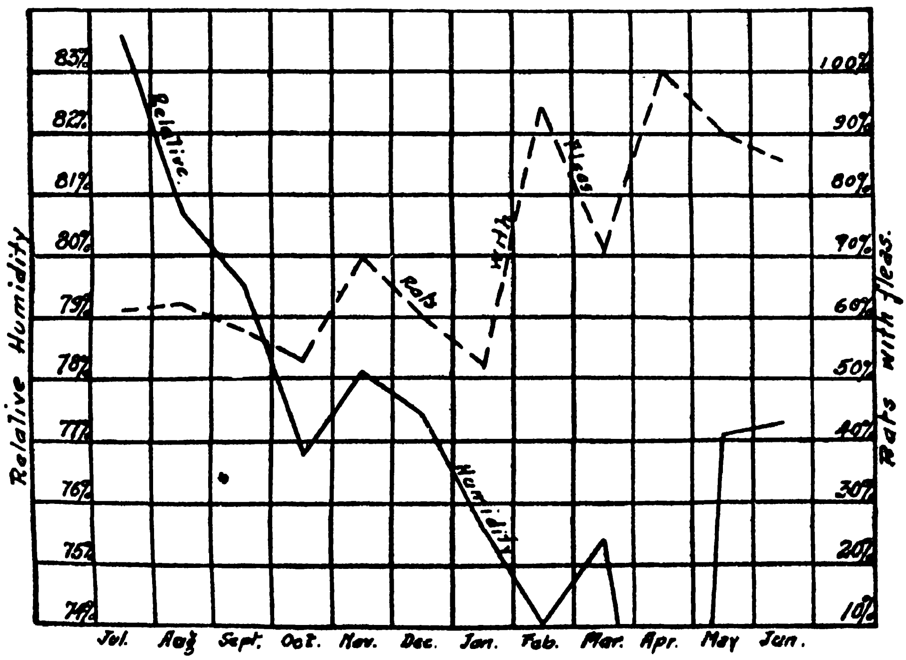

CHART 4.—Relative humidity and percentage of rats with fleas

These results correspond closely with the records for last year, although somewhat at variance with those of the year preceding.

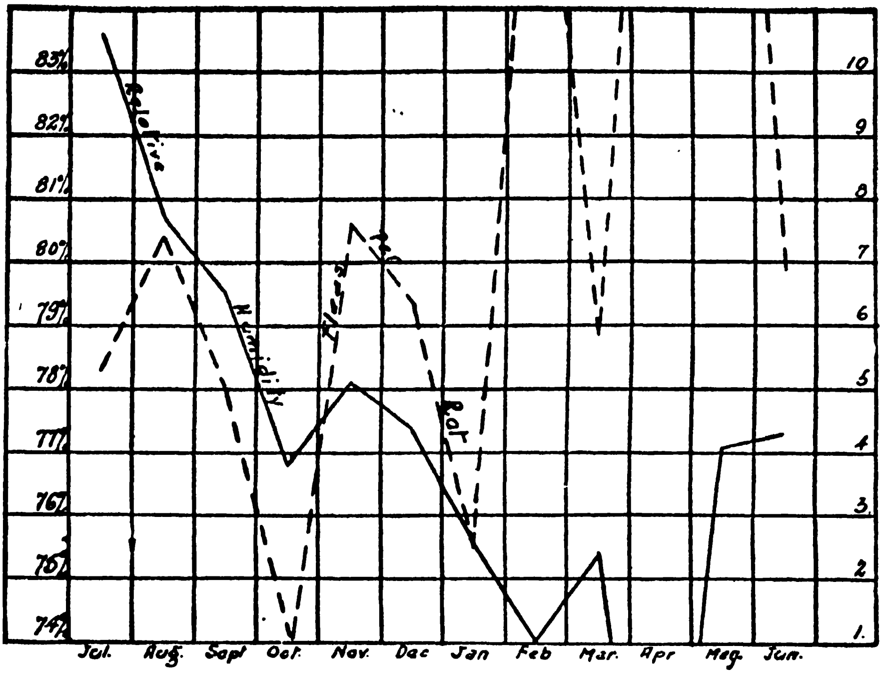

CHART 5.—Relative humidity and number of fleas per rat

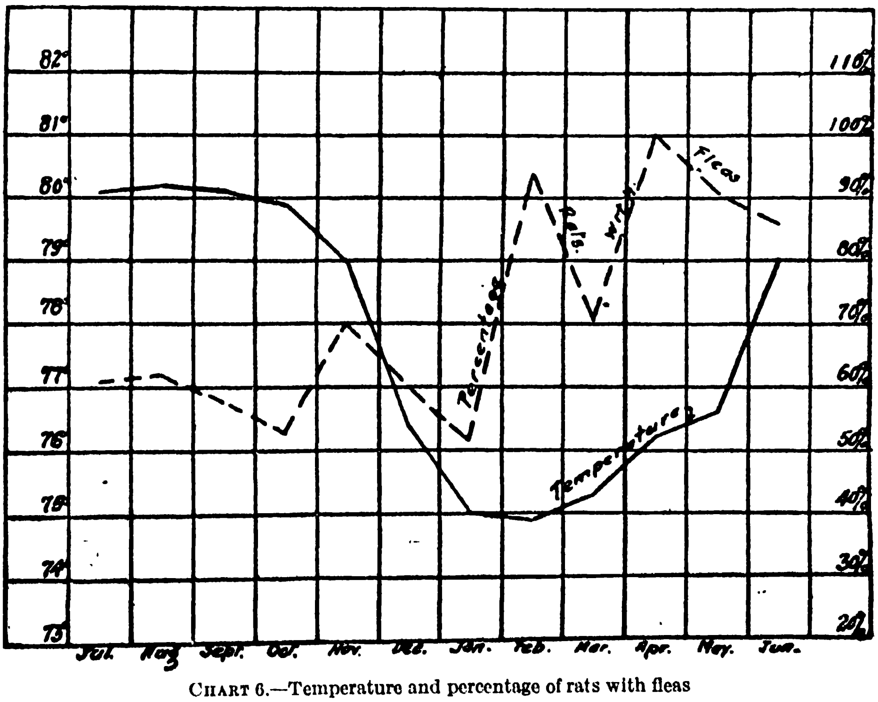

CHART 6.—Temperature and percentage of rats with fleas

So far as the relation of flea prevalence to atmospheric humidity is concerned it will be observed (see Charts 4 and 5) that the two

curves followed each other fairly well during the first half of the period; but a marked dissociation occurred, contrary to our expectation, during the last six months of the year. This was probably due to a considerable decrease in the rat catch which, for various reasons, took place after the cyclone.

SUMMARY

A total of 249 live rats were trapped in San Juan from July 1, 1928, to June 30, 1929. Concentration of the species has been moderately higher toward the residential and commercial zones.

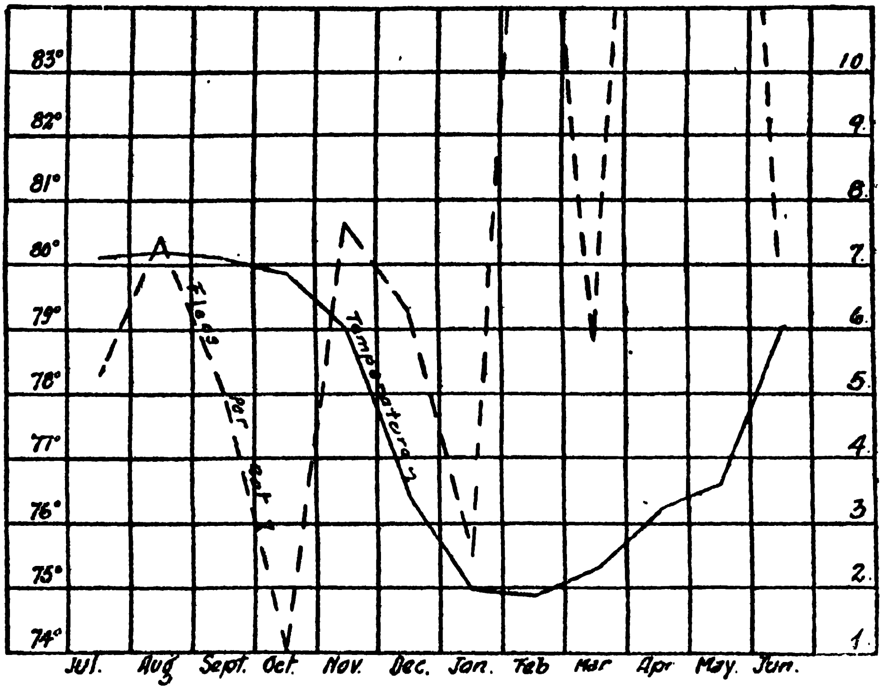

CHART 7.—Temperature and number of fleas per rat

The Norwegian rat practically predominated in all sections of the city.

Fleas were found on 68 per cent of the rodents captured. A total of 1,970 of these parasites was collected, their concentration appearing highest at the docks. The flea index reached 7.9 fleas per rat, and the cheopis index was 7.7. A few specimens of the three species *Echidnophaga gallinacea, Ctenocephalus canis* or *felis*, and *Pulex irritans* were encountered. The flea prevalence and the atmospheric humidity curves showed marked dissociation during the second half of the year.

We propose to give a summary of the three years' work as a whole and to comment on the general results of the survey in a future publication.

EXPERIMENTAL STUDIES OF WATER PURIFICATION

IV. Observations on the Effects of Certain Modifications in Coagulation-Sedimentation on the Bacterial Efficiency of Preliminary Water Treatment in Connection with Rapid Sand Filtration

By H. W. STREETER, *Sanitary Engineer, United States Public Health Service*

A. OBSERVED EFFECT OF VARIATIONS IN THE PERIOD OF SEDIMENTATION

INTRODUCTORY

The experimental observations recorded in this paper were made during the years 1926, 1927, and 1928, in connection with a series of experiments designed to test the effects which certain modifications in the preliminary treatment of water, as practiced in conjunction with ordinary rapid sand filtration, may have on the bacterial efficiency of such processes. The more specific objective of the series of experiments of which these observations were a part was to ascertain, as far as possible, the extent to which different elaborations and adjustments in the technique of rapid sand filtration processes of water purification, not involving any radical changes in the design or construction of existing plants of this type, might be expected to increase their bacterial efficiency under various working conditions.

For purposes of these experiments advantage was taken of the availability of a fully equipped large-scale experimental rapid sand water filtration plant, which was constructed by the Public Health Service on the grounds of the Stream Pollution Laboratory at Cincinnati in 1924, with the primary object of checking, under controlled conditions approaching as closely as possible those of normal full-scale plant operation, the results of a series of observational and collective surveys of the efficiency of a selected group of municipal water purification plants treating river waters of the middle-western and eastern States.[1] The experimental plant having served the more immediate purpose above stated,[2] it was decided, after conference with Special Consultant Joseph W. Ellms and with the Board of Consultants[3] of the Public Health Service in stream pollution investigations, to utilize the plant for the further experiments to be described in part in this report.

For observations of this character the experimental plant at Cincinnati was exceptionally well adapted, both because of certain features of its design, incorporated with a special view to experi-

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[1] The results of these surveys have been published in Public Health Bulletins Nos. 172 and 193, also in the Public Health Reports, issues of Mar. 31, 1922, pp. 741-753 (Reprint No. 737), and Jan. 30, 1925, pp. 202-213 (Reprint No. 987).

[2] For a description of the experimental plant and a discussion of the results of the primary series of experiments, reference is made to the Public Health Reports, issues of Oct. 1, 1926, pp. 2121-2146 (Reprint No. 1114) and July 15, 1927, pp. 1841-1859 (Reprint No. 1170).

[3] The personnel of this board consists of Dr. W. H. Frost, Dr. Edwin O. Jordan, Mr. Langdon Pearse Prof. Earle B. Phelps, and Dr. Lowell J. Reed.

mental work, and because the results of the primary series of experiments had indicated that the performance of this plant paralleled closely, under similar conditions of operation, that of the average full-scale municipal rapid sand filtration plant treating raw waters of the Ohio River type. Under these circumstances the results obtained from the experimental plant would be expected to be applicable, without any substantial modification, to those of full-scale water-purification practice.

The particular features of the experimental plant which made it especially suitable for observations such as those described in this report were as follows: (*a*) Provision of facilities for the continuous admixture of sewage or of clear dilution water with Ohio River water in any desired proportions; (*b*) division of the plant into two parallel sections throughout, each section capable of being operated independently of the other; (*c*) interconnection of the several plant units so as to allow a maximum degree of flexibility in the operation of various combinations of units; and (*d*) continuous wastage of the plant effluent into a near-by sewer, obviating any possibility of danger to water consumers resulting from the experiments. With the arrangements above described, the character of the raw water can be adjusted arbitrarily to almost any required turbidity or bacterial content, and parallel observations, under identical physical conditions, can be made simultaneously on the same raw water with any two different kinds or degrees of treatment, subject to certain limitations which will be noted later in this report.

In the experiments to be described under the general title of this paper, the observations were confined to those factors which may exert a possible influence on the bacterial efficiency of preliminary coagulation and sedimentation. In the first section of the paper, here presented, the observed effects of variations in the period of sedimentation will be discussed. The second section, to be presented closely following this one, will deal with the effects of certain modifications in the conditions surrounding the coagulation process. In succeeding papers of the series, the results of observations made during the years 1927 and 1928, respectively, on the influence of raw-water prechlorination and excess-lime treatment on the bacterial efficiency of the rapid sand filtration process will be described in the order named.

It long has been recognized that a definite relationship exists between the period of subsidence provided in sedimentation basins and the proportion of the suspended matter removed by such basins. Among the more extensive observations made in this country, those of Weston,[4] conducted at New Orleans nearly 30 years ago, in connection with experiments on the purification of Mississippi River

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[4] Water Works Handbook, Flinn-Bogert-Weston, p. 688.

water, and, very recently, those of Bull and Darby,[5] have been especially notable. In these and other similar studies attention has been devoted largely, however, to the removal of turbidity, or suspended matter, rather than to the removal of bacteria. In the experiments under this heading herein recorded, primary consideration was given to bacterial removal, in line with the objectives of these studies.

The conditions under which these observations were made were modified very considerably by the arrangement of the sedimentation basin and filters, as originally incorporated in the design of the experimental plant for purposes of the primary series of experiments. In order to permit the parallel operation of the two sections of the plant, as previously indicated, the sedimentation basin is divided longitudinally into two equal compartments, each provided with separate inlet and outlet connections leading to the two filters. The two basin compartments can be operated either in parallel, connected separately to the two filters, or in series, connected to one or both filters. With the several combinations of the basin compartments and filters it is possible to secure nominal periods of sedimentation approximating 3, 6, 9, or 12 hours, respectively, with a standard rate of filtration equivalent to 2 gallons per square foot per minute. The only combination in which two different sedimentation periods can be obtained simultaneously is one in which the two basin compartments are operated in series with each other and half of the total flow diverted to one filter at the outlet end of the first compartment, the remaining half passing on through the second compartment and thence to the second filter. With this arrangement the nominal period of sedimentation in the first compartment is 3 hours and in the second 6 hours, the total period for water passing through both compartments being 9 hours.

With the single exception above noted, it was necessary, in these experiments, to make the comparative observations of bacterial removal with different periods of sedimentation at various times, rather than simultaneously, a limitation which increased very considerably the difficulty of obtaining strictly comparable results, because of changing conditions not subject to absolute control. In the early stages of the experiments, an endeavor was made to offset this difficulty by making each series of observations, with varying periods of sedimentation, over comparatively short intervals of time, such as a week, during which the physical conditions surrounding the observations remained fairly constant. The results of these observations were not entirely satisfactory, however, as the "lag" effects produced by frequent changes in the sedimentation period disturbed

[5] Sedimentation Studies of Turbid River Waters. Bull, A. W., and Darby, G. M. Jour. Am. W. W. Assoc., vol. 19, No. 3, Mar., 1928, pp. 284-305.

the normal performance of the basin very perceptibly. After a number of trials this method of procedure was abandoned in favor of more extensive series of observations, with each one of the various periods of sedimentation sustained over a considerable interval of time. From these observations fairly comparable results with different sedimentation periods could be secured by selecting and classifying the data according to definitely restricted ranges of those variable conditions, notably raw-water bacterial content, which in themselves influence the efficiency of bacterial removal.

Inasmuch as the experimental plant ordinarily is operated with a nominal period of sedimentation approximating six hours, and as a long series of observations using this period had been made, both in connection with and following the primary experiments,[6] it was considered unnecessary to extend this particular series any further in connection with the more special observations herein recorded, which were confined, therefore, to a study of the comparative results obtained with sedimentation periods approximating 3, 9, and 12 hours, respectively. Two series of experiments were made with these three periods, one (designated as Series A) being made over a period of 56 test days, with parallel observations of the results obtained simultaneously from treatment of the same raw water after three and nine hours of sedimentation, respectively, and the other (designated as Series B) being made over a period aggregating 25 days, with a period of sedimentation approximating 12 hours. The Series A observations were made largely in September and October, 1926, and those of Series B at various times during the spring and autumn of the same year. The total number of laboratory observations, each involving the examination of a complete set of raw-water and effluent samples, aggregated about 200 in Series A and about 100 in Series B.

In conducting these experiments an effort was made to maintain all conditions of treatment of the water as nearly constant as practicable, consistent with normal operating practice. In general, the amounts of coagulant were regulated in accordance with variations in the turbidity of the raw water, so as to produce, after coagulation and sedimentation, an "applied" water having a turbidity falling within a comparatively narrow range, usually below 25 parts per million. The rate of filtration was held constant at 2 gallons per square foot per minute (125,000,000 gallons per acre daily) throughout the experiments.

The results of the experiments have been summarized in two tables, Nos. 1 and 2, the former containing the 37° C. plate count data, and the latter, giving the corresponding *B. coli* results. In the upper portion of each table are given the results of the Series A

[6] See Reprint No. 1114 from the Public Health Reports, pp. 12 et seq.

observations, with sedimentation periods approximating 3 and 9 hours, and in the lower portion, those of the Series B experiments, with a sedimentation period of 12 hours. In both instances the mean results for each test day, as observed both in the raw water and, simultaneously, in the applied and filtered effluents, were classified and averaged according to the numbers of raw-water bacteria falling into various ranges forming a continuous series of ascending magnitude, using the same method of "grouping" as previously followed in analyzing the data of these studies.[7] The ranges of raw-water bacteria used in classifying the results of the Series A experiments did not coincide with those followed in the case of Series B, because the bacterial densities occurring in the raw water were of a lower order of magnitude in the latter series than in the former. In order to compare the relative proportions of turbidity and of bacterial removal under parallel conditions, the corresponding average turbidities of the raw and applied waters, as determined on the same samples for which the bacterial figures are given under each group, have been added to each table.

TABLE 1.—*Comparative numbers and residual percentages of bacterial count observed in applied and filtered waters, with different periods of sedimentation*

SERIES A. SEDIMENTATION PERIODS, THREE AND NINE HOURS (PARALLEL OBSERVATIONS, WITH SAME RAW WATER)

Raw-water count range	Sedimentation period	Bacterial count, 37° C., 24 hours					Turbidity		
		Average count per c. c.			Per cent of raw in—		P. P. M.		Per cent of raw
		Raw	Applied	Filtered	Applied	Filtered	Raw	Applied	
	Hours								
0-10,000	3	7,030	1,260	141.0	18.0	2.00	211	15.0	6.2
	9	7,030	940	141.0	13.4	2.00	241	4.8	2.0
10,000-20,000	3	12,900	3,440	337.0	26.6	2.60	239	34.0	14.2
	9	12,900	2,840	244.0	22.0	1.90	239	14.0	5.9
20,001-40,000	3	29,200	7,780	802.0	26.6	2.70	180	18.0	10.0
	9	29,200	4,480	403.0	15.4	1.40	180	4.9	2.7
40,001-80,000	3	65,800	10,400	2,590.0	15.8	3.90	297	35.0	11.8
	9	65,800	7,230	1,590.0	11.0	2.40	297	13.0	4.4
Over 80,000	3	278,000	48,200	17,700.0	17.4	6.40	228	7.0	3.1
	9								
SERIES B. SEDIMENTATION PERIOD, 12 HOURS (SEPARATE OBSERVATIONS)									
0-2,500	12	1,720	276	18.8	16.1	1.09	163	32	19.6
2,501-5,000	12	3,720	350	19.0	9.4	.51	256	31	12.1
Over 5,000	12	6,470	519	20.0	8.0	.31	506	15	3.0

[7] See Public Health Bulletin No. 172, pp. 18-19.

TABLE 2.—*Comparative numbers and residual percentages of B. coli and turbidity in effluents produced from same raw water after three and nine hours of sedimentation*

SERIES A. SEDIMENTATION PERIODS, THREE AND NINE HOURS (PARALLEL OBSERVATIONS, WITH SAME RAW WATER)

Raw-water index range	Sedimentation period	B. coli index per 100 c. c.					Turbidity		
		Average index per 100 c. c.			Per cent of raw in—		P. P. M.		Per cent of raw
		Raw	Applied	Filtered	Applied	Filtered	Raw	Applied	
	Hours								
0-10,000	3	8,520	3,080	31.0	36.2	0.36	205	5.4	2.6
	9	8,520	1,720	31.0	20.2	.36	205	5.4	2.6
10,001-50,000	3	33,900	6,930	221.0	20.4	.65	263	21.4	8.1
	9	33,900	5,200	87.0	15.3	.26	263	11.0	4.2
50,001-100,000	3	71,300	23,100	464.0	32.4	.65	187	11.0	5.9
	9	71,300	14,100	234.0	19.7	.33	187	5.7	3.0
100,001-500,000	3	420,000	95,700	1,300.0	22.8	.31	77	4.2	5.5
	9	420,000	47,100	72.0	11.2	.017	77	1.7	2.2
500,001-1,000,000	3	775,000	196,000	11,000.0	25.3	1.42	287	24.0	8.4
	9	775,000	98,500	2,420.0	12.7	.31	287	12.0	4.2
Over 1,000,000	3	4,073,000	675,000	21,700.0	16.6	.53	509	79.0	15.5
	9	4,073,000	400,000	8,250.0	9.8	.20	509	28.0	5.5

SERIES B. SEDIMENTATION PERIOD, 12 HOURS (SEPARATE OBSERVATIONS)

0-5,000	12	2,070	482	10.8	23.3	0.52	332.0	11.0	3.3
5,001-10,000	12	7,190	1,190	5.4	16.5	.07	210.0	13.0	6.2
Over 10,000	12	426,000	32,500	291.0	7.6	.07	5.5	4.0	73.0

The results obtained from the experiments of Series A, being based on a larger number of observations covering a longer period, and also having afforded a comparison of the bacterial efficiencies shown with two different sedimentation periods in treating the same raw water under exactly parallel conditions, were more satisfactory from every standpoint than those of Series B. On referring to Tables 1 and 2, it will be noted that the efficiencies of bacterial and turbidity removal were consistently higher with the sedimentation period of nine hours than with that of three hours. In general the proportion of turbidity removed by coagulation and sedimentation was shown to be distinctly higher at both periods than the corresponding proportion of bacteria removed, though this tendency is not shown quite as consistently in the results of the Series B observations. The bacterial removal accomplished by sedimentation and filtration combined, which is indicated by the residual percentages of bacteria in the filtered effluent, does not show as consistently wide a margin in favor of the longer sedimentation period as is true of sedimentation alone, indicating that the efficiency of filtration, as a separate stage of treatment, probably was impaired slightly by reason of the larger pro-

portion of the total burden of purification assumed by sedimentation with the longer period of retention of water in the basin.

In order to show more clearly the comparative bacterial efficiencies of sedimentation observed with different periods of retention of water in the basin, the raw-water bacterial counts at 37° C., as given in Table 1, have been plotted, as in Figure 1, against the corresponding counts observed in the applied water, coincidently with the three different periods of sedimentation, using logarithmic abscissa and ordinate scales. In this chart the plotted points have been connected

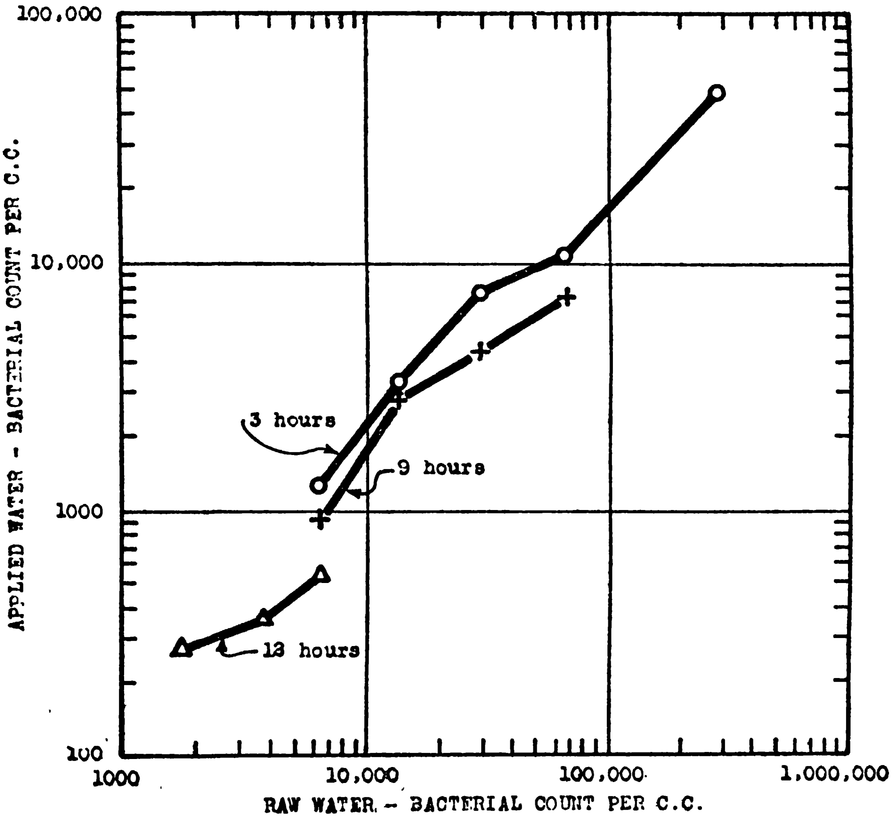

FIGURE 1.—Relations observed between 37° C. bacterial count of raw and applied waters, with nominal sedimentation periods of 3, 9, and 12 hours, respectively. (Plot of data given in Table No. 1)

merely by broken lines, in order to indicate their general trend. On referring to the chart it will be noted that the plots of the parallel observations made with three and nine hours of sedimentation show consistently a margin of advantage in favor of the latter period. The 12-hour plot, though in this case failing to overlap the other two sufficiently to afford a direct comparison, has a decidedly lower trend than the latter, indicating roughly a higher efficiency of bacterial removal in the lower ranges of bacterial density.

A similar plot of the *B. coli* data given in Table 2, which is shown in Figure 2, was much more satisfactory for purposes of comparison,

both because the plotted points were more regular in their trend and because the plot based on the 12-hour sedimentation period observations overlapped the range of the other two plots sufficiently to afford a basis for their direct comparison. In this case the alignment of the plotted points, though marked by one decided irregularity in the case of the 3-hour observations, followed straight-line trends so closely that their courses could be represented very fairly by straight rather than broken lines. The relative positions of these straight lines, as shown in the chart, are approximately parallel to each other

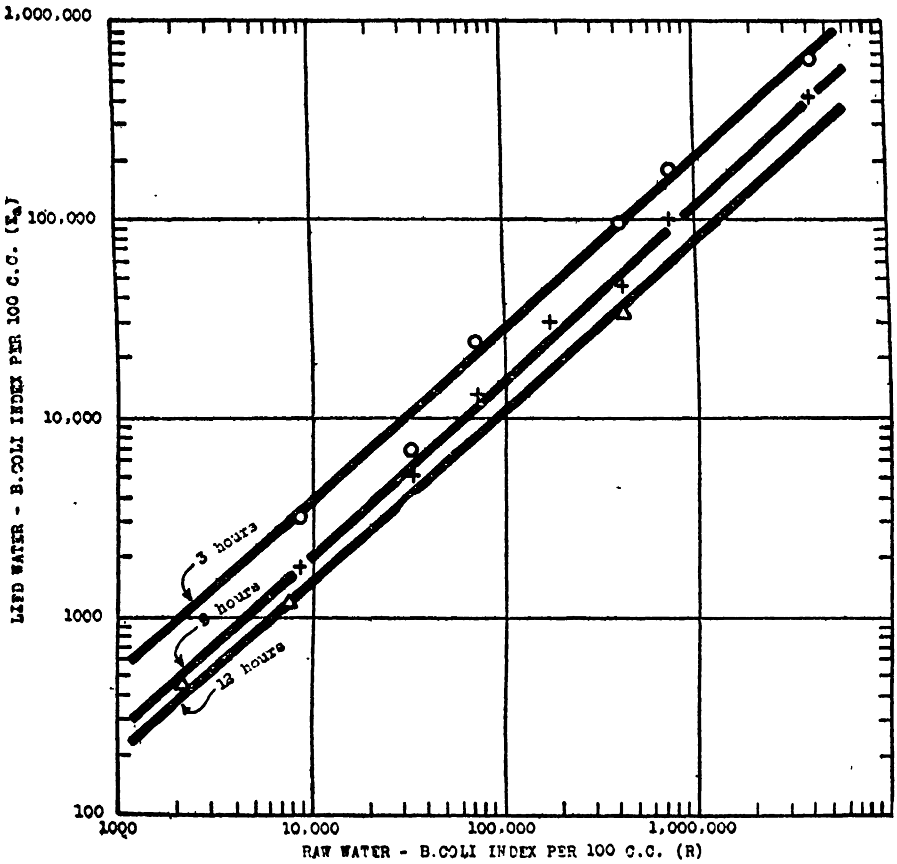

FIGURE 2.—Relations observed between *B. coli* index of raw and applied waters, with nominal sedimentation periods of 3, 9, and 12 hours, respectively. (Plot of data given in Table No. 2)

and lower on the ordinate scale with increased periods of sedimentation, indicating that the proportionate degree of variability in the bacterial quality of the applied water was about the same at all three sedimentation periods, but that the general level of bacterial efficiency thereby represented was consistently higher with the longer periods of sedimentation.

From the slopes and positions of the three lines, the respective equations of the relationships represented by them were readily obtained from Figure 2. Denoting as (*R*) the *B. coli* index of the

raw water and as (E_a) the corresponding *B. coli* index of the applied water, and bearing in mind that both abscissa and ordinate scales are logarithmic, the general equation of the lines is:

$$\log E_a = n \log R + \log c$$

in which (n) is the slope of the line and $\log c$ its linear intercept on the (E_a) scale when $\log R$ equals unity. Clearing the equation of logarithms, we then have

$$E_a = cR^n$$

which is the same as that which previously was found in these studies to represent the relationship between the bacterial quality of influent and effluent waters of water-purification processes.[8] From Figure 2 the following equations of the three lines were derived, the values of (c) and (n) being determined as above indicated:

$$\text{Sedimentation period, 3 hours: } E_a = 1.20\ R^{0.88} \qquad (1)$$
$$\text{Sedimentation period, 9 hours: } E_a = 0.60\ R^{0.88} \qquad (2)$$
$$\text{Sedimentation period, 12 hours: } E_a = 0.53\ R^{0.87} \qquad (3)$$

A comparison of these three equations was made with a view to determining whether they could be combined into a single equation connecting the values of their constants with the period of sedimentation. It was found that the product of the value of (c) in each equation and the logarithm of the corresponding period of sedimentation was equal to a quantity practically constant for the three equations; thus,

$$1.20 \times \log\ 3 = 0.573$$
$$0.60 \times \log\ 9 = 0.571$$
$$0.53 \times \log\ 12 = 0.572$$

The value of (c) in any one of the equations was represented very closely, therefore, by the expression

$$c = \left(\frac{0.572}{\log\ T}\right)$$

in which 0.572 is the mean of the products above given and (T) denotes the period of sedimentation in hours. As the value of (n) in the three equations was nearly constant, its mean value, 0.88, was taken as the value of (n) in the combined equation, which thus became:

$$E_a = \frac{0.572}{\log\ T} R^{0.88} \qquad (4)$$

[8] See Public Health Bulletin No. 172, pp. 31-32 and 124-133.

Although equation (4) represents only a rough approximation of a more general relationship connecting the bacterial efficiency of coagulation-sedimentation with the period of sedimentation, it was useful as a means of estimating very roughly the extent to which the efficiency of *B. coli* removal by this preliminary stage of treatment might become modified by interpolating or extrapolating the period of sedimentation between or beyond those at which the observations were made.

An indication of the trend of such efficiency with reference to the sedimentation period is given in Figure 3, in which the numbers of

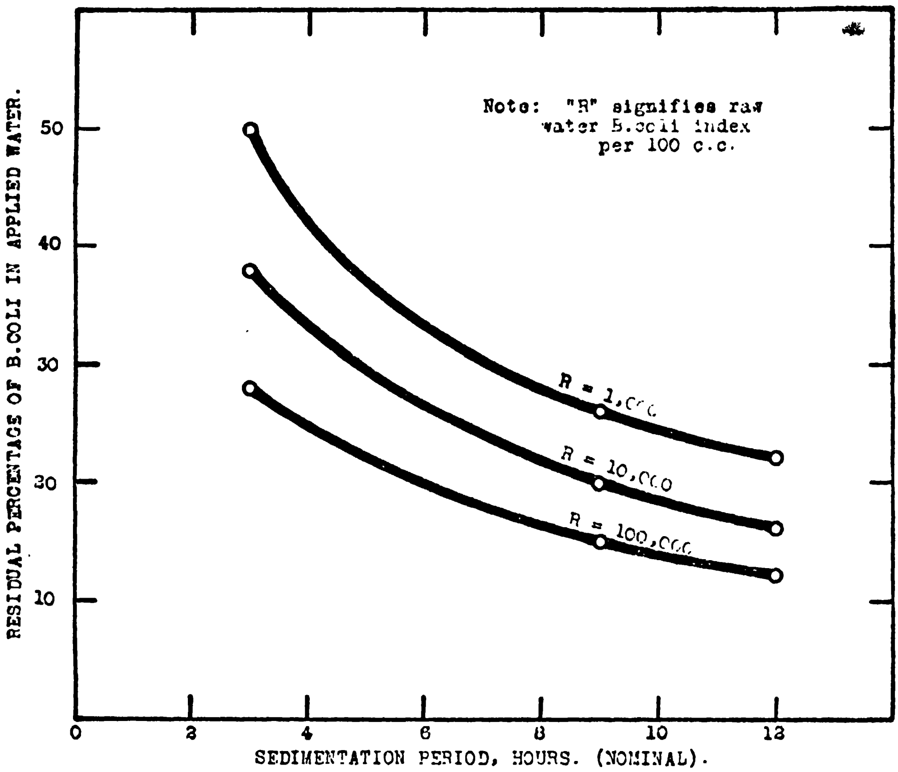

FIGURE 3.—Relation between period of sedimentation and residual percentages of raw water *B. coli* in applied water, corresponding to indicated numbers of raw water *B. coli*. (Derived from plots shown in Figure 2)

B. coli in the applied water corresponding to raw-water numbers of 1,000, 10,000, and 100,000, respectively, as taken from the relationship lines in Figure 2, have been converted to residual percentages of these raw-water numbers. In Figure 3 it will be noted that as the period of sedimentation approaches 12 hours, the residual percentage curves show a definite trend toward diminishing slopes, tending to become asymptotic to horizontal lines, the positions of which probably represent approximately the maximum efficiencies attainable with more prolonged sedimentation periods. Very considerable gains in bacterial efficiency are shown to occur, however, with sedimentation

periods ranging up to eight or nine hours, the increase being more manifest with the lower densities of raw water *B. coli.*

Although the foregoing observations were concerned primarily with the bacterial efficiency of preliminary coagulation-sedimentation, it was of interest in this connection to consider the effects which variations in the period of sedimentation were indicated as having on the bacterial quality of the unchlorinated and the chlorinated filter effluents of the experimental plant. Because of the limited extent of these particular observations, the relationships observed directly

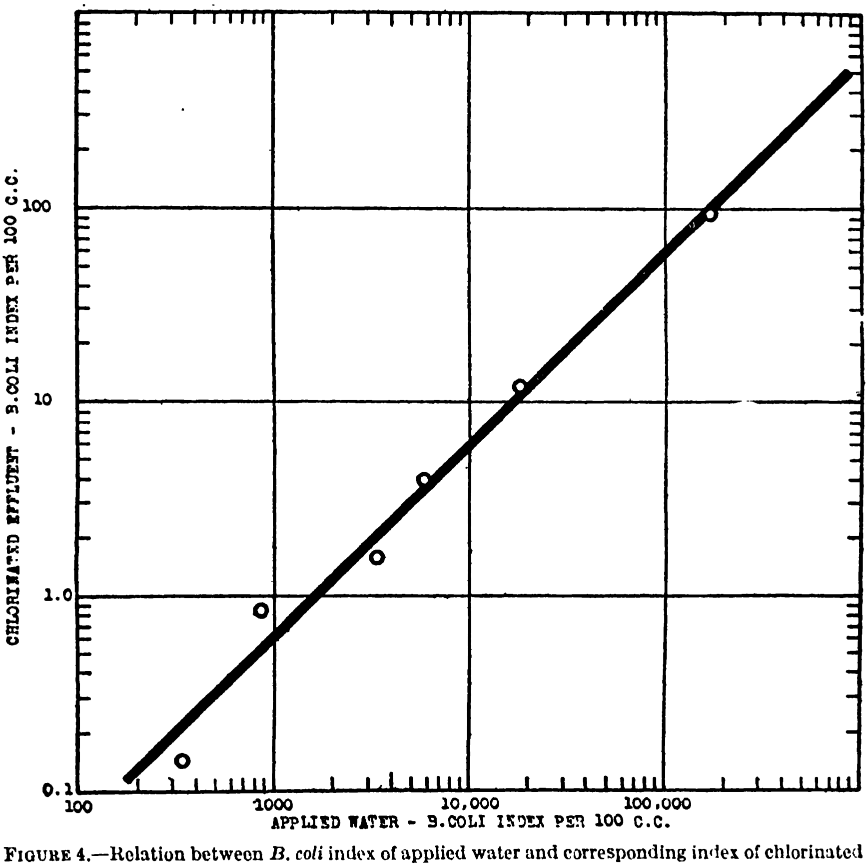

FIGURE 4.—Relation between *B. coli* index of applied water and corresponding index of chlorinated filter effluent. (Based on data given in Table No. 3)

between the bacterial quality of the raw water and that of the two effluents indicated were not defined with sufficient clearness to permit a sharp differentiation of their trends with various sedimentation periods, as was the case in Figure 2, though a fairly consistent divergence is shown in Tables 1 and 2 between the bacterial qualities of the unchlorinated filter effluent observed coincidently with sedimentation periods of three and nine hours, respectively.

A more satisfactory method of dealing with this phase of the problem was afforded by the results of the more extensive observa-

tions made in connection with the primary series of experiments, which afforded a basis for defining not only the relationships between the bacterial quality of the raw water and that of the several effluents, as described in previous reports of this series,[9] but also the corresponding relationships between the quality of the water applied to the filters and that of the unchlorinated and chlorinated filter effluents. By using either one of these relationships in combination with those shown in Figure 2, it thus was possible to estimate the extent to which the bacterial content of one or the other of the two filter effluents indicated might be expected to be modified by differences in the period of sedimentation, affecting the quality of the water applied to the filters.

The results of such an estimate may be illustrated by the following example, in which the effect of varying the sedimentation period on the *B. coli* content of the chlorinated filtered effluent was calculated. In Table 3 and, graphically, in Figure 4 is shown the relationship observed between the *B. coli* index of the applied water and the corresponding index of the chlorinated filtered effluent, as derived from data of the primary series of experiments embracing a period of 15 months. This relationship was derived by grouping the *B. coli* data according to the daily average *B. coli* indices of the applied water falling within the various ranges specified in Table 3.

TABLE 3.—*Relations observed between B. coli index of applied water and corresponding index of chlorinated filter effluent*

Applied water B. coli index range	Average B. coli index		Residual per cent in chlorinated	Applied water B. coli index range	Average B. coli index		Residual per cent in chlorinated
	Applied	Chlorinated			Applied	Chlorinated	
0–750	356	0.14	0.039	5,001–7,500	5,840	4.0	0.068
751–1,000	888	.86	.097	7,501–50,000	18,400	12.0	.065
1,001–5,000	3,480	1.5	.043	Over 50,000	167,000	95.0	.057

The plot of the relationship given in Figure 4, which is based on the corresponding group averages in Table 3, indicates a high degree of correlation between the *B. coli* content of the applied water and chlorinated effluent. As the slope of the relationship line was equal, in this case, to unity (i. e., $n=1$), it was indicated that the relation thus observed was a straight-line one, in which the *B. coli* index of the chlorinated effluent varied in direct proportion to that of the applied water. From inspection, the value of (c) for the line was readily determined as approximating 0.0006; hence the equation of the relationship was

$$E_c = 0.0006\ E_a \tag{5}$$

[9] See Reprint No. 1114 from the Public Health Reports, Table 1 and Figure 1, pp. 13–14.

in which (E_c) denotes the *B. coli* index of the chlorinated effluent and (E_a) the corresponding *B. coli* index of the applied water. The value of (c) thus derived was checked roughly by noting that the mean of the residual percentages in Table 3 was 0.061 per cent, or 0.00061 in terms of a simple decimal.

Referring to Figure 2, the ordinate (E_a) of each relationship line corresponding to a given abscissal value (R) gives the *B. coli* index of the applied water corresponding to that of the raw water, for the particular period of sedimentation thereby represented. If this ordinate value be referred to the abscissa scale of Figure 4, the corresponding ordinate (E_c) of the relationship line shown in that chart will give the corresponding *B. coli* index of the chlorinated effluent. The same result may be obtained analytically by substituting the equivalent of (E_a), in equation (5), into equations (1), (2), and (3), thus:

$$\frac{E_c}{0.0006}=1.20\ R^{0.89};\ \text{whence}\ E_c=0.00072\ R^{0.88} \tag{6}$$

$$\frac{E_c}{1.0006}=0.60\ R^{0.90};\ \text{whence}\ E_c=0.00036\ R^{0.88} \tag{7}$$

$$\frac{E_c}{0.0006}=0.53\ R^{0.83};\ \text{whence}\ E_c=0.000318\ R^{0.87} \tag{8}$$

From equations (6), (7), and (8), values of the ordinate (E_c) may be calculated for various assumed values of (E_a).

Following the procedure above described, relationship lines connecting the *B. coli* index of the raw water with the corresponding index of the chlorinated effluent, with sedimentation periods approximating 3, 9, and 12 hours, respectively, were drawn as shown in Figure 5. As a check on the rationality of these lines, both as to position and as to slope, a corresponding line based on the more extensive observations made with six hours of sedimentation, in connection with the primary series of experiments, has been transscribed to the chart from a previously published report of these experiments.[10] Both the position and slope of this line are so consistent with those of the other lines as to indicate that the latter probably are fairly representative of the effect of variations in the sedimentation period on the *B. coli* content of the chlorinated effluent, in spite of the indirect method by which they were derived.

Following the same procedure as in the case of Figure 2, a rough approximation to a general equation connecting values of (c) and (n)

[10] Reprint No. 1114, Public Health Reports, Figure 1, p. 14. (For this line, $c=0.0008$ and $n=0.82$.)

in equations (6), (7), and (8) with the nominal period of sedimentation was derived, this equation being

$$E_c = \frac{0.000344}{\log T} R^{0.88} \tag{9}$$

The relationship defined by equation (9), though probably not capable of generalized application without further experimental verification under conditions other than those described in this report,

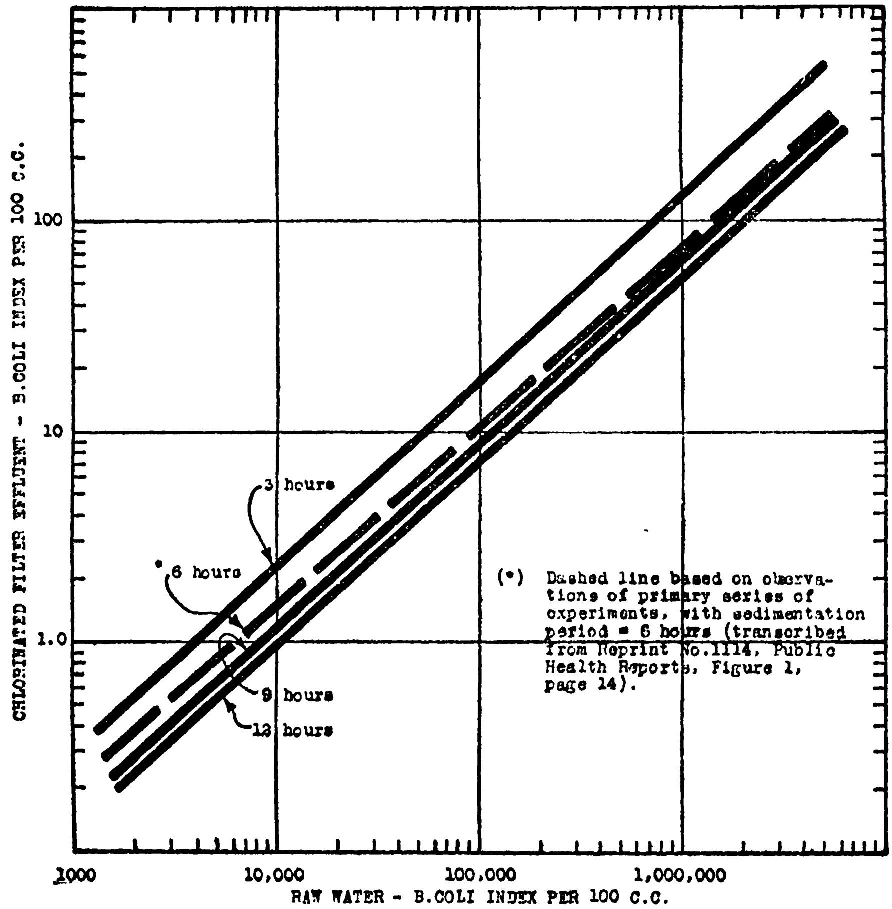

FIGURE 5.—Relation between *B. coli* index of raw and chlorinated waters, with different nominal periods of sedimentation, as based on combined relations shown in Figures 2 and 4

was useful in affording a basis for estimating roughly the effect which prolongation of the period of sedimentation might be expected to have on the bacterial quality of final effluent produced from raw water of the same *B. coli* content, or, conversely, on the limiting *B. coli* index of the raw water corresponding to a quality of effluent falling within the limit of a given standard. In the latter connection the following estimate thus was made of the maximum raw water *B. coli* index yielding a quality of chlorinated filtered effluent meeting

the primary requirement of the revised Treasury Department *B. coli* standard, coincidently with various specified periods of sedimentation:

Period of sedimentation, hours (*T*)	Maximum permissible raw water B. coli index per 100 c. c.
3	3,700
6	6,200
9	8,300
12	9,600
24	12,C00
48	15,C00

On referring to a plot of this relationship, as given in Figure 6, it will be noted that the permissible raw water *B. coli* maximum in-

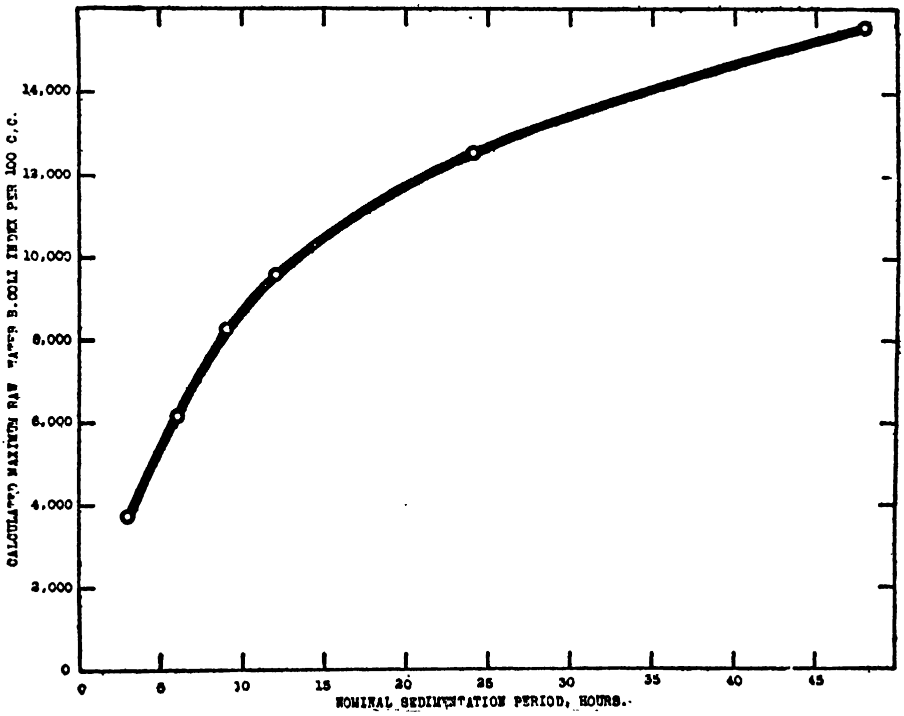

FIGURE 6.—Relation between the nominal period of sedimentation and the calculated maximum raw water *B. coli* index corresponding to a chlorinated filter effluent index not exceeding 1.0 per 100 cubic centimeters. (Calculation made by means of Equation 9)

creases with the period of sedimentation very considerably up to an index of about 10,000, corresponding to a period slightly over 12 hours, but at a rapidly diminishing rate for longer periods. Interpreting these results broadly, it would appear that substantial gains in the permissible limit of raw water pollution could be effected by prolonging the sedimentation period up to approximately 12 hours, but that further extension of the period beyond this time probably would not add sufficiently to such a limit to justify the increased

basin capacity required. Thus, it is indicated in Figure 6 that a fourfold increase in the sedimentation period from 3 to 12 hours would raise the permissible raw water *B. coli* maximum by 160 per cent, whereas the same proportionate increase from 12 to 48 hours would raise the maximum by only 62 per cent.

Without undertaking here to analyze the factors of relative cost involved in the foregoing question, it may be stated, in so far as is indicated by the results of these experiments, that the economical limiting period of sedimentation for Ohio River water after coagulation appears to lie somewhere between 8 and 12 hours, as expressed in terms of nominal retention. As previously noted, very considerable increases in the bacterial efficiency of coagulation-sedimentation were observed with periods ranging as high as eight hours, which represent somewhat longer retention times than ordinarily are provided at full-scale plants, except those at which double-stage treatment of this kind is practiced.

(The second section of this paper, dealing with the effects of certain modifications in conditions surrounding the coagulation process, will appear in the following issue of Public Health Reports.)

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for April, 1930

The accompanying table, taken from the Statistical Bulletin for May, 1930, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for April, 1930, as compared with the preceding month and with the corresponding month of last year. It also gives the cumulative rates for the period January–April for the years 1929 and 1930. Death rates are given for the principal causes of death. These rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada.

In April the death rate for these persons was lower than for the corresponding month of last year, as was the case in each of the preceding months of the current year. In only two years, it is stated, 1927 and 1922, has the April death rate for this group of persons been lower than that for this year. The cumulative death rate for the first four months of 1930 is also much lower than that for the similar period of 1929, and somewhat lower than the figure for the corresponding months of 1928.

The Bulletin states:

While the greatest single factor in this year's more favorable health record has been the decline in the influenza-pneumonia death rate, the most significant items are the cumulative death rates of 85.2 per hundred thousand for tuberculosis (all forms) and 74 for tuberculosis of the respiratory system. These

figures mark a drop since last year in the mortality rate for all forms of tuberculosis of 9.7 per cent and for respiratory tuberculosis of 12.2 per cent. But these declines are even more significant when it is considered that they have occurred in the very part of the year when the mortality from tuberculosis runs highest. So great has been the gain this year that the tuberculosis death rate for the season of highest mortality is at substantially the same figure as recorded for the *whole* year 1929. It is easy to see that when the lower death rates of the summer and fall enter into the computation, the tuberculosis mortality rate for 1930 is destined to fall to a point far below that recorded for any preceding year.

Another outstandingly favorable health development of 1930 is the drop of more than 20 per cent in the mortality from diphtheria. The cumulative death rate for this disease at the end of April, 1930, was far below that for the corresponding period of any preceding year. Improvement is also in evidence for typhoid fever, measles, whooping cough, diabetes, heart disease, respiratory conditions other than pneumonia, diarrheal complaints, chronic nephritis, cancer, puerperal conditions, and accidents. The drop in the cancer death rate is very slight and may be entirely wiped out by figures for later months.

With the exception of the increase in automobile fatalities, no cause of death had shown, up to the end of April, any noteworthy increase over the death rate for the like period of 1929. The death rate from motor vehicle accidents, however, seems destined to go on registering new high points each year.

Death rates (annual basis) per 100,000 for principal causes of death, April, 1930

[Industrial department, Metropolitan Life Insurance Co.]

Causes of death	Death rate per 100,000 lives exposed [1]				
	April, 1930	March, 1930	April, 1929	Cumulative, January-April	
				1930	1929
Total, all causes	975.2	940.6	994.4	955.7	1,113.7
Typhoid fever	1.0	1.1	1.5	1.1	1.5
Measles	6.5	3.0	5.4	4.0	4.2
Scarlet fever	4.1	3.3	4.1	3.8	3.6
Whooping cough	4.4	4.2	5.7	4.7	6.9
Diphtheria	6.2	6.8	9.2	8.2	10.3
Influenza	19.8	25.3	33.1	25.5	99.8
Tuberculosis (all forms)	90.4	86.1	95.5	85.2	94.4
Tuberculosis of respiratory system	77.4	75.4	85.9	74.0	84.3
Cancer	78.5	74.2	76.0	75.7	76.3
Diabetes mellitus	19.6	19.6	19.4	20.5	22.7
Cerebral hemorrhage	65.4	62.9	[2] 60.5	63.6	[2] 64.0
Organic diseases of heart	164.2	159.5	161.7	163.4	175.1
Pneumonia (all forms)	118.7	119.0	111.2	115.3	151.2
Other respiratory diseases	13.5	14.0	13.3	13.2	16.0
Diarrhea and enteritis	11.8	11.1	12.1	11.5	13.3
Bright's disease (chronic nephritis)	76.4	70.7	74.5	72.1	78.1
Puerperal state	10.8	13.1	14.0	12.9	14.7
Suicides	10.3	9.8	9.7	9.2	8.7
Homicides	5.7	7.5	6.5	6.6	6.4
Other external causes (excluding suicides and homicides)	52.4	48.7	57.9	55.7	56.8
Traumatism by automobiles	17.9	13.9	17.2	17.3	15.6
All other causes	215.5	200.1	222.9	203.4	209.7

[1] All figures in this table include infants insured under 1 year of age and are subject to slight correction, as they are based on provisional estimates of lives exposed to risk.
[2] Rate not comparable with that for 1930.

COURT DECISION RELATING TO PUBLIC HEALTH

Statutory provision making compensation for the destruction of tuberculous cattle held not to violate State constitution.—(California Supreme Court; Patrick *v.* Riley, State Controller, 287 P. 455; decided Apr. 21, 1930.) Chapter 829 of the 1929 statutes, known as the "Bovine tuberculosis law," made provision for the examination and tuberculin testing of dairy animals and for the branding, segregation, and slaughter of animals reacting positively to the tuberculin test. Section 10 of said act provided in part as follows:

* * * In consideration of the fact that the eradication of bovine tuberculosis is beneficial to public health and welfare, that before said animal is branded as provided for in section 9 of this act and/or slaughtered its value shall be determined by appraisement, as provided for herein, * * *; whereupon the owner of said reacting cattle shall be given a written memorandum signed by or under the authority of said director of agriculture in substance and effect, and in behalf of the State of California, promising that the said State will pay said owner in consideration for the slaughter of said reacting animals, the amount of money herein prescribed therefor. * * *

In a mandamus proceeding to compel the State controller to draw warrants on the State treasurer for the payment of certain claims, evidenced by memoranda such as mentioned in the above-quoted section, the controller based his refusal to draw the warrants on the ground that the provisions authorizing compensation for animals destroyed were in violation of section 31 of article 4 of the State constitution which declared that the legislature shall not "make any gift or authorize the making of any gift, of any public money or thing of value to any individual."

The holding of the supreme court was in favor of the petitioner. Regarding the constitutional provision in question, the court quoted from a prior opinion as follows:

* * * In other decisions, both prior and subsequent to the Conlin Case, supra, this court has pointed out that, where the question arises as to whether or not a proposed application of public funds is to be deemed a gift within the meaning of that term as used in the constitution, the primary and fundamental subject of inquiry is as to whether the money is to be used for a public or a private purpose. If it is for a public purpose within the jurisdiction of the appropriating board or body, it is not, generally speaking, to be regarded as a gift. * * *

Proceeding then to a discussion of the bovine tuberculosis law, the court said:

That the act here in question was enacted for a public purpose is beyond question, and, being a law for the suppression of disease and the promotion of the public health, it should be given a broad and liberal construction that it may accomplish the purpose intended in enacting it. [Cases cited.] In construing such an act, the courts must presume that the legislature has carefully investigated and has properly determined that the interests of the public require legislation that will insure the public safety and the public health against threatened danger from diseased animals. The determination of that fact is the province of the

legislature, and not of the courts. It is also the province of the legislature, in the exercise of a sound discretion, to determine what measures are necessary for the protection of such interests. [Cases cited.] We are not prepared to say that the legislature in this act has abused its discretion, or that the measures it has adopted, including the provision for compensation, to prevent the spread of tuberculosis among cattle, are unnecessary and unreasonable or in violation of section 31 of article 4 of the constitution.

* * * The question whether the public interests of the State would be at all advanced by compensating the owners of cattle destroyed under the provisions of the "Bovine tuberculosis law" was an appropriate one for discussion and determination by the legislature before its enactment. * * *

It is our conclusion, therefore, that, while the legislature, in the exercise of the police power, might have directed the slaughter of diseased cattle without making any provision for compensation to the owners, it did not violate section 31 of article 4 of the constitution by refusing to exert the full measure of its might. * * *

DEATHS DURING WEEK ENDED JUNE 21, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended June 21, 1930, and corresponding week of 1929. (From the Weekly health Index, June 25, 1930, issued by the Bureau of the Census, Department of Commerce)

	Week ended June 21, 1930	Corresponding week, 1929
Policies in force	75, 896, 166	74, 409, 722
Number of death claims	13, 544	13, 536
Death claims per 1,000 policies in force, annual rate	9. 3	9. 5

Deaths from all causes in certain large cities of the United States during the week ended June 21, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, June 25, 1930, issued by the Bureau of the Census, Department of Commerce)

City	Week ended June 21, 1930		Annual death rate per 1,000, corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended June 21, 1930[2]
	Total deaths	Death rate [1]		Week ended June 21, 1930	Corresponding week, 1929	
Total (65 cities)	6, 508	11. 4	12. 1	575	648	[3] 50
Akron	37			3	4	27
Albany [4]	27	11. 7	16. 0	2	3	44
Atlanta	82	16. 8	21. 7	11	9	116
White	36			3	4	95
Colored	46	(5)	(5)	8	5	127
Baltimore [4]	164	10. 3	14. 3	13	26	44
White	131			10	16	43
Colored	33	(5)	(5)	3	10	49
Birmingham	63	14. 8	15. 9	3	9	28
White	27			3	5	46
Colored	36	(5)	(5)	0	4	0
Boston	200	13. 0	13. 1	21	19	59
Bridgeport	23			4	6	68
Buffalo	113	10. 6	9. 8	11	12	49
Cambridge	28	11. 6	9. 1	2	2	37
Camden	34	13. 1	10. 8	4	1	73
Canton	19	8. 5	5. 8	0	1	0
Chicago [4]	608	10. 0	12. 1	49	69	43
Cincinnati	130			13	5	77
Cleveland	173	8. 9	9. 8	8	11	24
Columbus	78	13. 6	12. 0	2	4	20

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended June 21, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929—Continued

City	Week ended June 21, 1930		Annual death rate per 1,000, corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended June 21, 1930 [2]
	Total deaths	Death rate [1]		Week ended June 21, 1930	Corresponding week, 1929	
Dallas	61	14.6	18.7	8	10	
White	46			7	7	
Colored	15	(5)	(5)	1	3	
Dayton	48	13.6	13.0	2	4	30
Denver	64	11.3	11.5	6	6	63
Des Moines	27	9.3	11.7	1	3	17
Detroit	263	9.9	11.0	33	37	51
Duluth	22	9.8	12.1	2	3	54
El Paso	33	14.6	19.0	8	13	
Erie	21			0	4	0
Fall River [4]	25	9.7	8.2	4	2	92
Flint	30	10.5	9.1	6	3	70
Fort Worth	33	10.1	11.0	7	3	
White	23			5	2	
Colored	10	(5)	(5)	2	1	
Grand Rapids	41	13.0	13.3	1	6	15
Houston	75			11	6	
White	41			5	4	
Colored	34	(5)	(5)	6	2	
Indianapolis	93	12.7	14.7	3	8	22
White	78			3	7	26
Colored	15	(5)	(5)	0	1	0
Jersey City	50	8.0	10.0	5	8	43
Kansas City, Kans	23	10.1	11.0	2	3	47
White	18			2	1	53
Colored	5	(5)	(5)	0	2	0
Kansas City, Mo	102	13.6	11.5	14	6	109
Knoxville	29	14.3	8.9	5	5	117
White	22			4	4	104
Colored	7	(5)	(5)	1	1	247
Los Angeles	295			20	27	61
Louisville	77	12.2	8.7	5	3	43
White	55			3	1	30
Colored	22	(5)	(5)	2	2	145
Lowell	26			2	4	47
Lynn	27	13.3	9.9	2	3	51
Memphis	81	22.2	18.4	4	6	48
White	44			2	4	37
Colored	37	(5)	(5)	2	2	67
Milwaukee	101	9.7	8.3	11	11	55
Minneapolis	97	11.1	10.3	4	8	26
Nashville	52	19.4	22.0	6	7	93
White	31			6	6	123
Colored	21	(5)	(5)	0	1	0
New Bedford	29			1	2	26
New Haven	49	13.6	10.5	4	1	78
New Orleans	150	18.2	20.2	17	19	98
White	95			12	10	106
Colored	55	(5)	(5)	5	9	84
New York	1,321	11.4	12.0	131	108	55
Bronx boro	179	9.8	10.0	7	9	16
Brooklyn boro	441	10.0	10.1	49	48	52
Manhattan boro	522	15.5	17.6	60	43	98
Queens boro	137	8.4	7.9	11	5	32
Richmond boro	42	14.5	13.5	4	3	74
Newark, N. J	78	8.6	11.9	7	8	37
Oakland	63	12.0	12.6	2	5	24
Oklahoma City	39			6	3	118
Omha	54	12.6	11.9	3	3	34
Paterson	19	6.8	13.3	0	3	0
Philadelphia	415	10.5	11.5	29	33	43
Pittsburgh	147	11.4	15.1	14	15	51
Portland, Oreg	78			2	6	25
Providence	56	10.2	9.5	4	7	37
Richmond	54	14.5	14.2	5	7	74
White	31			2	5	45
Colored	23	(5)	(5)	5	2	131
Rochester	67	10.6	10.6	7	8	62
St. Louis	220	13.5	12.5	13	25	42
St. Paul	53			4	4	41
Salt Lake City [4]	32	12.1	7.9	2	4	31
San Antonio	82	19.6	12.4	18	13	

See footnotes at end of table

Deaths from all causes in certain large cities of the United States during the week ended June 21, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929—Continued

City	Week ended June 21, 1930		Annual death rate per 1,000, corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended June 21, 1930[2]
	Total deaths	Death rate[1]		Week ended June 21, 1930	Corresponding week, 1929	
San Diego	36			0	2	0
San Francisco	132	11.8	11.0	11	12	75
Schenectady	18	10.1	16.2	0	4	0
Seattle	84	11.4	8.0	4	6	40
Somerville	12	6.1	5.6	1	2	33
Spokane	32	15.3	12.9	2	1	52
Springfield, Mass	32	11.1	12.9	3	1	47
Syracuse	46	12.0	9.9	0	4	0
Tacoma	19	9.0	12.7	0	2	0
Toledo	64	10.7	13.8	13	7	119
Trenton	34	12.8	13.1	3	4	56
Utica	21	10.5	14.0	1	2	28
Washington, D. C	135	12.8	12.6	8	7	46
White	91			7	3	60
Colored	44	(5)	(5)	1	4	18
Waterbury	20			6	1	154
Wilmington, Del	27	11.0	9.7	1	2	23
Worcester	28	7.4	11.9	2	6	26
Yonkers	26	11.2	6.4	2	1	48
Youngstown	23	6.9	8.7	3	4	47

[1] Annual rate per 1,000 population.
[2] Deaths under 1 year per 1,000 births. Cities left blank are not in the registration area for births.
[3] Data for 73 cities.
[4] Deaths for week ended Friday.
[5] In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended June 21, 1930, and June 22, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 21, 1930, and June 22, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929
New England States:								
Maine	9	1	1	2	47	54	1	2
New Hampshire	1	1			20	60	0	0
Vermont					39	2	0	0
Massachusetts	47	64	1	4	878	374	3	4
Rhode Island	3	3			5	42	0	0
Connecticut	13	20		1	46	152	2	1
Middle Atlantic States:								
New York	111	233	[1] 8	[1] 1	2,025	723	16	15
New Jersey	76	81	1	1	939	173	0	6
Pennsylvania	98	125			1,033	929	3	9
East North Central States:								
Ohio	26	32	3	8	336	442	4	16
Indiana	13	11			134	196	6	2
Illinois	131	207	3	22	390	1,058	6	10
Michigan	75	102	4	1	802	564	12	60
Wisconsin	21	21	12		326	914	5	5
West North Central States:								
Minnesota	10	13	2	2	98	144	2	2
Iowa	6	2			63	74	1	3
Missouri	12	37			59	73	3	8
North Dakota	4	11			11	78	0	1
South Dakota	8	4			90	9	1	0
Nebraska	5	6			75	154	1	0
Kansas	4	6	4		170	316	0	6
South Atlantic States:								
Delaware		1			6	10	0	0
Maryland [2]	12	24	7	12	37	26	0	2
District of Columbia	2	10		1	65	13	1	0
West Virginia	4	6	10		41	134	1	1
North Carolina	11	24	5		54	9	4	1
South Carolina	11	8	137	124			3	0
Georgia	2	8	4	14	56	27	2	0
Florida	7	5		1	38	23	0	1
East South Central States:								
Kentucky						25	2	2
Tennessee	6	2	6	4	47	13	11	2
Alabama	10	17	21	13	111	38	3	2
Mississippi	10	13					0	

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 21, 1930, and June 22, 1929—Continued

Arkansas	3	4	8	6	24	1	0	2
Louisiana	15	12	10	7	7	37	1	2
Oklahoma [3]	4	7	4	23	55	32	2	3
Texas	9	30	11	18	72	91	1	0
Mountain States:								
Montana					21	57	0	5
Idaho	1	1			7	31	1	0
Wyoming	3	1			44	18	0	0
Colorado	2	9		1	286	19	2	1
New Mexico	13	10	1		34	12	2	0
Arizona		4			44	1	2	3
Utah [2]	1		6		129	2	1	2
Pacific States:								
Washington	5	2			383	91	1	4
Oregon	2	11	7	2	103	92	1	4
California	45	58	18	21	1,186	152	4	12

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929
New England States:								
Maine	0	0	14	10	0	0	1	3
New Hampshire	0	0	3	4	0	0	0	0
Vermont	0	0	5	1	0	1	0	0
Massachusetts	1	1	102	148	0	0	2	7
Rhode Island	0	1	5	3	0	0	0	0
Connecticut	0	0	44	25	0	0	1	3
Middle Atlantic States:								
New York	4	2	228	236	14	0	11	12
New Jersey	0	1	101	69	0	0	5	4
Pennsylvania	2	2	253	240	0	0	16	15
East North Central States:								
Ohio	1	0	116	98	79	84	14	0
Indiana	0	0	50	83	124	43	4	1
Illinois	0	0	247	269	53	4	17	11
Michigan	0	1	220	335	75	52	11	2
Wisconsin	0	1	90	78	80	8	4	2
West North Central States:								
Minnesota	0	0	46	43	7	6	0	3
Iowa	0	0	22	38	89	36	0	3
Missouri	0	1	65	34	20	16	3	14
North Dakota	2	1	11	20	4	10	0	0
South Dakota	0	0	2	4	24	17	0	1
Nebraska	0	0	40	22	27	12	2	2
Kansas	0	1	22	20	71	34	8	4
South Atlantic States:								
Delaware	0	0	7	0	0	0	0	1
Maryland [2]	0	0	34	46	0	0	8	7
District of Columbia	0	0	4	7	0	0	1	0
West Virginia	0	0	12	15	12	11	5	8
North Carolina	4	2	9	18	9	11	34	21
South Carolina	3	0	2	3	1	1	62	45
Georgia	0	0	4	3	0		28	33
Florida	0	0	0	6	0		3	2
East South Central States:								
Kentucky	0	0	13	75	3	25	8	5
Tennessee	0	1	17	5	2	1	28	28
Alabama	5	2	16	15	10	0	26	21
Mississippi	0	0	4	3	10	2	28	25

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa and for 1929 are exclusive of Oklahoma City only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 21, 1930, and June 22, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929	Week ended June 21, 1930	Week ended June 22, 1929
West South Central States:								
Arkansas	0	0	2	12	2	2	15	9
Louisiana	27	0	24	13	0	11	30	16
Oklahoma [3]	0	0	7	14	57	76	4	17
Texas	2	0	11	21	107	66	7	27
Mountain States:								
Montana	1	0	24	20	4	4	2	5
Idaho	0	0	0	2	1	7	0	0
Wyoming	0	0	0	1	5	5	0	7
Colorado	0	0	17	21	12	10	0	3
New Mexico	0	0	1	6	9	4	3	1
Arizona	2	0	1	0	0	1	1	4
Utah [2]	0	0	8	4	0	7	1	0
Pacific States:								
Washington	0	0	14	17	23	21	5	2
Oregon	0	1	3	5	17	23	2	1
California	51	4	84	259	43	24	12	16

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa, and for 1929 are exclusive of Oklahoma City only.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April, 1930										
Delaware	2	10			59		0	38	0	2
May, 1930										
Arkansas	9	11	90	189	207	93	0	21	21	8
Idaho	12	5			201		0	30	25	2
Illinois	42	544	109	8	2,602		3	1,040	451	42
Indiana	34	60	56		800	1	2	594	689	18
Maine	4	13	26		402		0	132	0	19
Maryland	9	83	52		382		2	334	0	21
Michigan	91	260	16	2	7,309		1	1,056	269	16
Minnesota	11	48	3		882		1	475	31	11
Missouri	38	160	16	46	617	1	0	618	292	38
New Mexico	9	18		8	210	2	2	42	38	11
New York	59	507		9	10,613		8	1,974	29	61
Ohio	18	200	61	2	3,103		6	1,023	502	44
Pennsylvania	64	527		5	6,805	1	2	1,843	2	53
Rhode Island	1	22			75		0	93	0	9
South Carolina		112	1,402	1,783	284	1,209	9	25	16	103
West Virginia	7	37	58		416		0	107	159	57

April, 1930	Cases
Delaware:	
Chicken pox	35
Mumps	2
Undulant fever	1
Whooping cough	17
May, 1930	
Actinomycosis:	
Pennsylvania	1
Anthrax:	
New York	3
Pennsylvania	4
Chicken pox:	
Arkansas	61
Idaho	67
Illinois	1,180
Indiana	299
Maine	102
Maryland	661

Disease and State	Cases
Chickenpox—Continued.	
Michigan	985
Minnesota	570
Missouri	383
New Mexico	56
New York	2,072
Ohio	1,513
Pennsylvania	2,360
Rhode Island	108
South Carolina	378
West Virginia	204
Conjunctivitis:	
Maine	5
New Mexico	2
Dengue:	
South Carolina	2
Diarrhea:	
Maryland	2
South Carolina	3,138
Diarrhea and enteritis (under 2 years):	
Ohio	19
Dysentery:	
Illinois	9
Maryland	7
Minnesota (amebic)	3
New York	7
Ohio	4
Food poisoning:	
Ohio	11
German measles:	
Illinois	290
Maine	113
Maryland	423
New York	1,733
Ohio	117
Rhode Island	105
South Carolina	44
Glandular fever:	
Maryland	1
Hookworm disease:	
Arkansas	4
South Carolina	138
Impetigo contagiosa:	
Maryland	2
Jamaica ginger paralysis:	
Arkansas	4
South Carolina	1
Lead poisoning:	
Illinois	6
Ohio	13
Pennsylvania	3
Leprosy:	
Illinois	1
Lethargic encephalitis:	
Illinois	6
Michigan	2
New Mexico	2
New York	22
Ohio	4
Pennsylvania	5
South Carolina	1

Disease and State	Cases
Mumps:	
Arkansas	33
Idaho	39
Illinois	897
Indiana	55
Maine	426
Maryland	95
Michigan	925
Missouri	268
New Mexico	188
New York	2,310
Ohio	670
Pennsylvania	1,529
Rhode Island	2
South Carolina	200
Ophthalmia neonatorum:	
Illinois	35
Maryland	2
Missouri	4
New York	2
Ohio	101
Pennsylavnia	8
South Carolina	12
Paratyphoid fever:	
Illinois	2
Maine	3
Maryland	1
Minnesota	1
New York	12
South Carolina	5
Puerperal septicemia:	
Illinois	7
New York	8
Ohio	9
South Carolina	5
Rabies in animals:	
Idaho	1
Illinois	7
Maryland	3
Missouri	9
New Mexico	1
New York	17
Rhode Island	9
South Carolina	18
Rabies in man:	
Michigan	1
Rocky Mountain spotted or tick fever:	
Idaho	7
Scabies:	
Maryland	2
Septic sore throat:	
Idaho	1
Illinois	9
Maine	4
Maryland	6
Michigan	21
Missouri	21
New York	16
Ohio	52
Tetanus:	
Illinois	6
New York	3
Ohio	3
Pennsylvania	9
South Carolina	1

	Cases
Trachoma:	
Arkansas	4
Illinois	5
Missouri	52
New York	3
Ohio	2
Pennsylvania	1
Rhode Island	1
Trichinosis:	
Pennsylvania	3
Tularaemia:	
Arkansas	1
Idaho	1
South Carolina	1
Typhus fever:	
Maryland	1
New York	1
Undulant fever:	
Illinois	6
Indiana	6
Maine	1
Maryland	1
Michigan	1
Minnesota	8
Missouri	8
New York	13

	Cases
Undulant fever—Continued.	
Ohio	37
Pennsylvania	4
South Carolina	1
Vincents, angina:	
Illinois	5
Maine	3
Maryland	12
New York	86
Whooping cough:	
Arkansas	117
Idaho	28
Illinois	736
Indiana	173
Maine	105
Maryland	161
Michigan	863
Minnesota	202
Missouri	188
New Mexico	4
New York	1,642
Ohio	683
Pennsylvania	1,011
Rhode Island	51
South Carolina	611
West Virginia	201

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 94 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,825,000. The estimated population of the 87 cities reporting deaths is more than 30,235,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended June 14, 1930, and June 15, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	900	1,186	
94 cities	488	646	729
Measles:			
45 States	13,103	10,215	
94 cities	5,116	2,888	
Meningococcus meningitis:			
46 States	118	202	
94 cities	39	90	
Poliomyelitis:			
47 States	70	30	
Scarlet fever:			
46 States	2,635	2,881	
94 cities	1,176	1,140	836
Smallpox:			
46 States	1,071	851	
94 cities	79	94	46
Typhoid fever:			
46 States	407	460	
94 cities	57	53	54
Deaths reported			
Influenza and pneumonia:			
87 cities	531	527	
Smallpox:			
87 cities	0	0	

City reports for week ended June 14, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded and the estimated expectancy is the mean number of cases reported for the week during non-epidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	13	1	1	----------	0	15	37	1
New Hampshire:								
Concord	0	0	0	----------	0	0	0	1
Manchester	----------	----------	----------	----------	----------	----------	----------	----------
Nashua	0	1	0	----------	0	3	0	0
Vermont:								
Barre	----------	0	----------	----------	----------	----------	----------	----------
Burlington	2	0	0	----------	0	0	0	1
Massachusetts:								
Boston	61	33	8	----------	0	453	38	16
Fall River	1	3	2	----------	0	1	5	0
Springfield	9	2	4	----------	0	9	3	0
Worcester	57	2	0	----------	0	112	0	0
Rhode Island:								
Pawtucket	6	0	0	----------	0	3	0	0
Providence	16	4	0	1	1	20	0	6
Connecticut:								
Bridgeport	6	5	0	----------	0	5	1	5
Hartford	7	4	1	----------	0	3	0	4
New Haven	8	1	0	----------	0	9	14	3
MIDDLE ATLANTIC								
New York:								
Buffalo	28	10	10	----------	0	3	23	10
New York	189	236	102	4	6	1,664	160	124
Rochester	9	8	3	----------	0	20	7	1
Syracuse	14	3	0	----------	0	38	48	3
New Jersey:								
Camden	1	6	2	----------	0	8	0	0
Newark	18	11	16	2	0	121	12	7
Trenton	4	2	10	----------	0	6	0	4
Pennsylvania:								
Philadelphia	81	53	19	----------	3	277	79	34
Pittsburgh	22	15	10	----------	1	140	10	27
Reading	7	2	0	----------	0	1	11	2
Scranton	----------	----------	----------	----------	----------	----------	----------	----------
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	2	5	3	----------	1	57	10	4
Cleveland	98	23	16	4	2	26	41	16
Columbus	10	2	6	1	1	43	3	2
Toledo	26	4	0	----------	0	24	8	2
Indiana:								
Fort Wayne	3	1	0	----------	0	2	0	0
Indianapolis	18	2	0	----------	0	28	1	9
South Bend	1	0	0	----------	0	2	0	0
Terre Haute	0	0	0	----------	0	42	0	5
Illinois:								
Chicago	104	82	133	9	4	29	85	35
Springfield	2	0	1	----------	0	20	0	0
Michigan:								
Detroit	61	40	46	1	1	296	65	21
Flint	6	2	0	----------	0	161	1	1
Grand Rapids	7	1	0	----------	0	1	3	5

City reports for week ended June 14, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	5	0	0		0	1	2	2
Madison	1	0	0		0	5	1	2
Milwaukee	93	11	1		0	16	119	7
Racine	9	0	0	1	1	6	2	0
Superior	0	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	5	1	0		0	9	1	5
Minneapolis	60	11	1		0	20	26	7
St. Paul	25	6	1		0	4	0	3
Iowa:								
Davenport	0	1	0			0	0	
Des Moines	0	1	0			0	0	
Sioux City	2	0	0			15	0	
Waterloo	3	0	0			0	0	
Missouri:								
Kansas City	8	2	0		1	2	1	6
St. Joseph	1	0	0		0	0	0	0
St. Louis	21	25	22			33	16	
North Dakota:								
Fargo	1	0	1		0	5	11	1
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	2	0	0			42	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Lincoln	26	1	0		0	2	2	0
Omaha		2						
Kansas:								
Topeka	13	0	0	1	4	20	10	1
Wichita	1	1	1		0	60	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	0	0		0	1	0	1
Maryland:								
Baltimore	80	18	8	2	0	11	5	11
Cumberland	0	0	1		0	1	0	0
Frederick	0	0	0		0	0	0	0
District of Columbia:								
Washington	28	7	3		0	56	0	13
Virginia:								
Lynchburg	4	1	1		0	12	0	0
Norfolk	5	0	1		0	3	3	2
Richmond	1	2	3		1	2	0	1
Roanoke	3	0	0		0	61	0	0
West Virginia:								
Charleston	3	0	0		0	2	0	0
Wheeling	1	0	0		0	5	1	0
North Carolina:								
Raleigh	0	0	0		0	0	0	0
Wilmington	2	0	0		0	0	0	1
Winston-Salem		0						
South Carolina:								
Charleston	0	0	0	7	0	0	0	2
Columbia	1	0	0		0	0	4	0
Georgia:								
Atlanta	6	1	1	3	0	20	6	5
Brunswick	0	0	0		0	2	0	0
Savannah	0	0	2		0	2	2	2
Florida:								
Miami	0	1	1		0	11	0	2
St. Petersburg		0			0			1
Tampa	0	1	2		0	23	1	2

City reports for week ended June 14, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	0		0	0	0	1
Tennessee:								
Memphis	9	1	2		0	0	0	4
Nashville	2	0	0	1	1	18	1	2
Alabama:								
Birmingham	2	1	0	1	1	9	3	6
Mobile	0	0	0		0	0	0	2
Montgomery	0	1	0	0		0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	1	2			9	0	
Little Rock	1	0	0		0	1	0	0
Louisiana:								
New Orleans	0	5	18	2	2	1	0	9
Shreveport	0	1	0		0	1	2	0
Oklahoma:								
Oklahoma City	0	0	0	6	0	0	3	4
Tulsa	2	0	0			1	0	
Texas:								
Dallas	4	3	3	2	2	12	2	5
Fort Worth	1	1	0		1	11	1	3
Galveston	0	0	0		0	0	0	3
Houston	2	2	0		0	2	0	7
San Antonio	0	2	0		3	1	0	4
MOUNTAIN								
Montana:								
Billings	0	0	0		0	16	0	1
Great Falls	3	0	0		0	1	1	0
Helena	0	0	0		0	0	0	1
Missoula	0	0	0		0	3	0	0
Idaho:								
Boise	1	0	0		0	4	0	2
Colorado:								
Denver	14	8	4		0	149	20	5
Pueblo	1	1	0		0	37	30	0
New Mexico:								
Albuquerque	2	0	0		0	9	0	0
Arizona:								
Phoenix	0	1	0		0	3	0	1
Utah:								
Salt Lake City	7	3	0		0	176	7	1
Nevada:								
Reno		0						
PACIFIC								
Washington:								
Seattle	23	3	1			209	62	
Spokane	13	2	0			47	0	
Tacoma	2	2	0		0	98	0	2
Oregon:								
Portland	7	6	4		0	39	6	5
Salem	1	0	0		0	2	2	0
California:								
Los Angeles	46	31	9	7	1	235	76	18
Sacramento	0	3	1		0	20	18	1
San Francisco	44	12	7		1	53	57	2

City reports for week ended June 14, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	1	1	0	0	0	0	1	0	0	11	22
New Hampshire:											
Concord	1	0	0	0	0	0	0	0	0	0	8
Manchester											
Nashua	1	0	0	0	0	0	0	0	0	0	
Vermont:											
Barre	0		0				0				
Burlington	0	0	0	0	0	0	0	0	0	0	15
Massachusetts:											
Boston	50	51	0	0	0	10	2	1	0	38	178
Fall River	3	2	0	0	0	2	0	1	0	3	19
Springfield	4	5	0	0	0	0	0	0	0	5	23
Worcester	6	9	0	0	0	0	0	0	0	4	36
Rhode Island:											
Pawtucket	1	2	0	0	0	0	0	0	0	3	13
Providence	6	9	0	0	0	2	1	2	0	5	51
Connecticut:											
Bridgeport	6	3	0	0	0	2	0	0	0	0	23
Hartford	3	4	0	0	0	1	0	0	0	2	45
New Haven	3	4	0	0	0	1	0	0	0	5	36
MIDDLE ATLANTIC											
New York:											
Buffalo	20	20	0	0	0	5	0	0	0	15	107
New York	174	143	0	0	0	122	11	12	3	79	1,460
Rochester	8	8	0	0	0	4	0	1	0	4	62
Syracuse	5	9	0	1	0	2	0	0	0	40	47
New Jersey:											
Camden	4	6	0	0	0	3	0	1	0	1	33
Newark	19	18	0	0	0	6	0	0	0	22	13
Trenton	2	4	0	0	0	3	0	0	0	1	30
Pennsylvania:											
Philadelphia	63	86	0	0	0	43	2	3	1	29	500
Pittsburgh	24	28	0	0	0	8	0	0	0	31	176
Reading	2	3	0	0	0	0	0	0	0	7	20
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	9	9	2	3	0	9	1	0	0	5	108
Cleveland	28	40	0	2	0	17	1	0	0	70	183
Columbus	4	10	1	0	0	7	0	0	1	5	80
Toledo	8	19	0	1	0	3	1	1	0	6	59
Indiana:											
Fort Wayne	1	6	1	1	0	1	0	1	0	2	30
Indianapolis	6	17	6	6	0	4	0	0	0	5	
South Bend	2	6	1	0	0	2	0	0	0	0	27
Terre Haute	1	0	0	0	0	0	0	0	0	0	16
Illinois:											
Chicago	84	217	2	0	0	47	2	4	1	79	677
Springfield	2	2	0	0	0	1	0	1	1	2	14
Michigan:											
Detroit	69	120	1	2	0	38	2	0	0	112	292
Flint	7	14	1	3	0	2	0	1	0	31	20
Grand Rapids	4	15	0	0	0	0	0	0	0	3	26
Wisconsin:											
Kenosha	1	0	0	0	0	0	0	0	0	4	8
Madison	1	2	0	0	0	3	0	0	0	11	21
Milwaukee	18	23	2	0	0	12	0	0	0	44	118
Racine	2	5	0	0	0	0	0	0	0	4	11
Superior	3	1	0	0	0	0	0	0	0	0	12
WEST NORTH CENTRAL											
Minnesota:											
Duluth	6	1	0	0	0	2	0	0	0	17	33
Minneapolis	24	13	2	1	0	6	0	0	0	6	103
St. Paul	15	8	0	0	0	3	0	0	0	2	70

City reports for week ended June 14, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—contd.											
Iowa:											
Davenport	0	1	0	24			0	0		0	
Des Moines	4	2	2	9			0	0		0	36
Sioux City	0	6	0	4			0	0		1	1
Waterloo	1	0	0	1			0	0		1	
Missouri:											
Kansas City	6	14	0	2	0	3	0	0	0	12	90
St. Joseph	0	2	1	2	0	2	0	0	0	0	31
St. Louis	17	67	1	5	0	10	2	2	1	6	205
North Dakota:											
Fargo	1	1	0	0	0	0	0	0	0	7	
Grand Forks	1	0	0	1			0	0		0	
South Dakota:											
Aberdeen	0	0	0	3			0	0		2	
Sioux Falls	0	1	0	5			0	0		0	7
Nebraska:											
Lincoln	1	7	1	1	0	0	0	0	0	17	
Omaha	2		2				0				
Kansas:											
Topeka	1	1	0	3	0	1	0	1	0	14	14
Wichita	1	4	1	0	0	1	0	0	0	3	25
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	5	0	0	0	1	0	0	0	0	29
Maryland:											
Baltimore	21	36	0	0	0	15	2	1	0	25	161
Cumberland	0	0	0	0	0	2	0	0	0	0	13
Frederick	0	0	0	0	0	0	0	0	0	0	4
District of Columbia:											
Washington	14	16	0	0	0	16	1	0	0	1	146
Virginia:											
Lynchburg	1	1	0	0	0	2	0	1	0	3	14
Norfolk	1	1	0	0	0	1	0	1	0	8	
Richmond	1	7	0	0	0	6	0	0	0	0	45
Roanoke	0	0	0	0	0	1	1	0	0	3	24
West Virginia:											
Charleston	0	1	1	0	0	2	0	0	0	5	16
Wheeling	2	0	0	0	0	1	0	0	0	1	14
North Carolina:											
Raleigh	0	1	0	4	0	0	0	0	1	1	10
Wilmington	0	0	0	0	0	0	0	0	0	15	10
Winston-Salem	0		1				1				
South Carolina:											
Charleston	0	0	1	0	0	1	1	0	0	0	19
Columbia	0	0	0	0	0	1	2	1	1	2	16
Georgia:											
Atlanta	3	8	3	0	0	5	2	1	0	13	76
Brunswick	0	0	0	0	0	0	0	0	0	0	10
Savannah	1	2	0	0	0	0	1	3	0	0	30
Florida:											
Miami	1	0	0	0	0	1	0	0	0	0	22
St. Petersburg	0		0		0	0	0		0		7
Tampa	0	2	0	0	0	0	0	1	0	0	19
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	1	1	0	0	1	0	0	0	0	15
Tennessee:											
Memphis	2	5	1	1	0	10	3	2	0	11	80
Nashville	1	0	0	5	0	4	1	1	0	0	37
Alabama:											
Birmingham	1	0	3	0	0	5	2	0	0	4	84
Mobile	0	0	0	0	0	1	0	1	0	0	24
Montgomery	0	2	0	0			0	0		0	

City reports for week ended June 14, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	-	-	0	0	-	4	-
Little Rock	1	0	0	0	0	0	1	0	0	0	-
Louisiana:											
New Orleans	3	4	0	0	0	16	3	3	1	2	145
Shreveport	0	1	1	0	0	4	1	0	0	2	30
Oklahoma:											
Oklahoma City	1	4	2	21	0	5	0	0	0	0	45
Tulsa	0	3	1	2	-	-	1	2	-	0	-
Texas:											
Dallas	2	3	1	2	0	5	1	1	0	15	67
Fort Worth	1	1	1	1	0	2	1	0	0	0	40
Galveston	0	0	0	0	0	0	0	0	0	0	15
Houston	1	2	1	4	0	5	1	0	0	0	85
San Antonio	0	0	0	0	0	6	0	1	0	0	91
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	10
Great Falls	1	10	0	0	0	0	0	0	0	1	7
Helena	0	0	0	0	0	0	0	0	0	1	2
Missoula	0	0	0	0	0	0	0	0	0	0	6
Idaho:											
Boise	1	0	0	0	0	0	0	0	0	0	8
Colorado:											
Denver	7	4	0	2	0	7	0	1	0	72	70
Pueblo	1	0	0	0	0	1	0	0	0	3	11
New Mexico:											
Albuquerque	0	1	0	0	0	1	0	0	0	0	8
Arizona:											
Phoenix	0	0	0	0	0	5	1	0	0	2	18
Utah:											
Salt Lake City	2	0	1	1	0	4	1	0	0	49	34
Nevada:											
Reno	0	-	0	-	-	-	0	-	-	-	-
PACIFIC											
Washington:											
Seattle	5	6	1	4	-	-	1	2	-	5	-
Spokane	4	0	3	8	-	-	1	0	-	32	-
Tacoma	2	1	2	1	0	1	0	0	0	3	20
Oregon:											
Portland	4	3	7	3	0	1	1	3	0	15	59
Salem	1	1	0	0	0	0	0	0	0	11	-
California:											
Los Angeles	24	23	3	6	0	23	1	2	0	28	252
Sacramento	2	3	1	5	0	1	1	2	0	1	25
San Francisco	14	15	0	0	0	12	1	2	0	2	136

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Massachusetts:									
Boston	1	2	0	0	0	0	0	0	0
Worcester	1	0	0	0	0	0	0	0	0
Rhode Island:									
Providence	0	1	0	1	0	0	0	0	0
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	1	0

City reports for week ended June 14, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
MIDDLE ATLANTIC									
New York:									
Buffalo	2	1	0	0	0	0	0	0	0
New York	10	6	0	1	0	0	2	1	0
Pennsylvania:									
Philadelphia	1	0	0	0	0	0	0	0	0
Pittsburgh	0	1	0	1	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cleveland	1	0	0	0	0	0	0	0	0
Toledo	2	0	0	0	0	0	0	0	0
Illinois:									
Chicago	3	3	0	0	0	0	1	0	0
Michigan:									
Detroit	8	4	0	0	1	0	0	0	0
Wisconsin:									
Milwaukee	0	1	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
St. Paul	1	1	0	0	0	0	0	0	0
Iowa:									
Waterloo	1	0	0	0	0	0	0	0	0
Missouri:									
St. Louis	2	0	0	0	0	0	0	0	0
North Dakota:									
Fargo	0	0	2	1	0	0	0	1	0
Kansas:									
Topeka	1	0	1	0	0	0	0	1	0
SOUTH ATLANTIC [2]									
District of Columbia:									
Washington	1	0	0	0	0	0	0	0	0
Virginia:									
Norfolk	1	0	0	0	0	0	0	0	0
Richmond	0	1	0	0	0	0	0	0	0
Roanoke	0	0	0	0	0	0	0	1	0
South Carolina:									
Charleston [1]	0	0	0	0	1	0	0	0	0
Columbia	0	0	0	0	0	1	0	0	0
Georgia:									
Atlanta	2	2	0	0	4	4	0	0	0
Savannah	0	0	0	0	2	2	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	4	0	0	0	1	0	0	0
Alabama:									
Birmingham	0	0	0	1	0	0	1	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	1	0	0	0	0
Louisiana:									
New Orleans	0	0	0	0	1	0	0	0	0
Shreveport	0	0	0	0	0	0	0	2	0
Oklahoma:									
Oklahoma City	0	0	0	0	2	0	0	0	0
Texas:									
Dallas	0	0	0	0	0	2	0	0	0
Fort Worth	0	0	0	0	0	2	0	0	0
Houston	0	0	0	0	0	1	0	0	0
MOUNTAIN									
Montana:									
Billings	0	1	0	0	0	0	0	0	0
Utah:									
Salt Lake City	1	0	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles	0	2	0	0	0	0	1	16	1
Sacramento	1	0	0	0	3	0	0	0	0
San Francisco	0	0	0	0	1	0	1	0	0

[1] Dengue: 1 case at Charleston, S. C.

[2] Typhus fever: 1 case at Tampa, Fla.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended June 14, 1930, compared with those for a like period ended June 15, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, May 11 to June 14, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	May 17, 1930	May 18, 1929	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929
98 cities	76	124	81	135	77	124	77	110	[2] 80	103
New England	97	94	62	108	51	60	86	72	[3] 36	79
Middle Atlantic	78	159	80	188	71	168	72	148	82	131
East North Central	91	143	117	165	111	155	113	123	129	115
West North Central	72	123	70	100	76	110	51	96	[4] 54	65
South Atlantic	49	62	49	49	55	41	49	54	[5] 40	64
East South Central	40	27	27	14	40	7	13	21	13	41
West South Central	71	110	56	46	52	57	41	88	86	84
Mountain	34	26	51	61	43	55	60	61	[6] 35	35
Pacific	50	56	69	60	78	58	76	56	43	34

MEASLES CASE RATES

	May 17, 1930	May 18, 1929	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929
98 cities	1,285	890	1,185	903	932	659	957	734	[2] 838	483
New England	1,688	431	1,719	552	1,425	364	1,462	602	[3] 1,401	337
Middle Atlantic	1,410	196	1,150	196	991	183	1,076	169	1,089	143
East North Central	822	2,138	692	2,286	529	1,597	517	1,827	457	1,152
West North Central	814	1,753	778	1,441	514	1,033	412	1,069	[4] 369	581
South Atlantic	1,123	474	875	242	725	298	478	233	[5] 374	242
East South Central	405	68	641	27	378	55	418	41	182	41
West South Central	788	331	587	430	486	234	123	400	101	209
Mountain	6,479	183	6,934	313	5,527	252	5,630	192	[6] 3,386	261
Pacific	1,949	425	2,541	529	1,630	398	2,220	403	1,564	384

SCARLET FEVER CASE RATES

	May 17, 1930	May 18, 1929	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929
98 cities	231	290	210	268	186	209	214	209	[2] 193	188
New England	239	247	288	281	281	269	230	191	[3] 200	204
Middle Atlantic	234	220	215	196	171	193	196	135	155	129
East North Central	311	472	229	449	142	417	296	321	304	322
West North Central	256	281	300	203	209	179	260	165	[4] 242	110
South Atlantic	157	210	150	159	115	273	156	300	[5] 149	133
East South Central	27	103	115	137	81	123	108	96	54	75
West South Central	78	179	52	118	15	160	78	76	37	107
Mountain	223	104	292	113	94	96	240	78	[6] 123	70
Pacific	149	297	113	336	83	246	109	270	113	251

SMALLPOX CASE RATES

	May 17, 1930	May 18, 1929	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929
98 cities	23	11	20	14	16	9	21	8	[2] 13	16
New England	0	0	0	7	0	0	0	0	[3] 0	0
Middle Atlantic	0	0	0	0	1	0	1	0	0	0
East North Central	16	14	10	20	13	15	8	17	11	28
West North Central	123	15	108	15	55	15	116	12	[4] 37	12
South Atlantic	4	2	2	4	9	0	4	2	[5] 8	4
East South Central	81	14	34	27	34	7	34	14	40	55
West South Central	22	50	11	15	15	19	22	8	22	42
Mountain	60	148	69	35	60	52	112	52	[6] 26	44
Pacific	54	14	83	75	57	27	68	14	57	46

See footnotes at end of table.

Summary of weekly reports from cities, May 11 to June 14, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	May 17, 1930	May 18, 1929	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929
98 cities	8	9	7	8	7	7	8	8	[2] 9	9
New England	9	9	18	7	11	2	4	7	[3] 9	11
Middle Atlantic	7	6	4	5	3	3	6	5	8	3
East North Central	2	3	5	3	3	3	4	3	4	4
West North Central	8	6	8	8	9	17	9	8	[4] 6	17
South Atlantic	13	17	11	15	13	19	20	17	[5] 15	11
East South Central	47	0	27	75	40	34	13	27	27	34
West South Central	37	65	11	11	22	19	37	27	19	19
Mountain	0	0	0	17	9	0	0	0	[6] 9	9
Pacific	2	7	7	10	9	2	2	12	19	19

INFLUENZA DEATH RATES

91 cities	8	8	6	10	4	7	5	7	[2] 7	6
New England	0	2	4	7	0	7	0	2	[3] 2	7
Middle Atlantic	7	8	8	8	4	4	4	5	5	4
East North Central	4	7	5	8	4	9	4	6	6	8
West North Central	3	0	0	15	3	3	12	3	[4] 17	9
South Atlantic	18	7	5	6	4	6	9	7	[5] 2	2
East South Central	44	30	22	45	37	0	15	22	15	7
West South Central	4	4	8	27	4	12	11	16	27	12
Mountain	9	17	9	9	17	17	9	35	[6] 0	0
Pacific	15	22	6	6	3	16	3	16	6	6

PNEUMONIA DEATH RATES

91 cities	104	106	103	116	80	105	86	90	[2] 85	86
New England	102	88	100	121	89	106	73	65	[3] 80	85
Middle Atlantic	130	114	137	129	94	113	106	105	101	98
East North Central	68	115	80	118	54	101	59	96	67	82
West North Central	106	75	83	123	68	120	130	81	[4] 82	54
South Atlantic	156	120	101	94	82	112	93	67	[5] 72	88
East South Central	96	90	88	104	110	112	81	60	110	104
West South Central	84	109	88	66	130	66	84	90	107	62
Mountain	77	13	120	139	77	113	129	61	[6] 88	113
Pacific	58	47	43	82	64	63	40	69	71	60

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1930 and 1929, respectively.
[2] Barre, Vt., Omaha, Nebr., Winston-Salem, N. C., and Reno, Nev., not included.
[3] Barre, Vt., not included.
[4] Omaha, Nebr., not included.
[5] Winston-Salem, N. C., not included.
[6] Reno, Nev., not included.

FOREIGN AND INSULAR

AZORES

St. Michaels—Plague.—According to recent information, a case of pneumonic plague was reported to have appeared on April 18, 1930, at San Roque, about a mile from Ponta Delgada, St. Michaels, Azores. Seven infected persons were subsequently placed in the quarantine hospital, five of whom died of the disease. Energetic measures have been taken against the disease, and no new cases have been reported in the infected region since April 26.

An erroneous report in a European newspaper gave the number of cases of plague for the week ended January 4, 1930, as 16, whereas in reality there were 9 cases and 5 deaths from both bubonic and pneumonic plague reported for that week at Ponta Carca, and Ribeira Grande.

CANADA

Provinces—Communicable diseases—Week ended June 7, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended June 7, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia		1				1
New Brunswick [1]						
Quebec	1			1		7
Ontario	2	6	1	1	14	7
Manitoba [1]						
Saskatchewan						2
Alberta [1]						
British Columbia	1				1	3
Total	4	7	1	2	15	20

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended June 14, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended June 14, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Measles	70
Chicken pox	83	Mumps	66
Diphtheria	30	Puerperal septicemia	1
Erysipelas	2	Scarlet fever	69
German measles	43	Tuberculosis	40
Influenza	1	Typhoid fever	7
Lethargic encephalitis	1	Whooping cough	24

CZECHOSLOVAKIA

Communicable diseases—April, 1930.—During the month of April, 1930, communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	5		Puerperal fever	68	21
Cerebrospinal meningitis	14	9	Scarlet fever	1,525	50
Diphtheria	1,626	122	Trachoma	281	
Dysentery	2		Typhoid fever	404	35
Malaria	9		Typhus fever	29	
Paratyphoid fever	10				

TRINIDAD (BRITISH WEST INDIES)

Port of Spain—Vital statistics (comparative)—April, 1930.—The following statistics for the month of April for the years 1929 and 1930 are taken from a report issued by the Public Health Department of Port of Spain, Trinidad:

	April, 1929	April, 1930		April, 1929	April, 1930
Number of births	150	171	Death rate per 1,000 population	19.6	19.9
Birth rate per 1,000 population	27.5	30.9	Deaths under 1 year	16	12
Number of deaths	106	110	Infant mortality rate per 1,000 births	106.7	70.2

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930			May, 1930					June, 1930		
						12	19	26	3	10	17	24	31	7	14	21
China:																
Canton	C										1	1	1			
Manchuria—Dairen	C			1												
Swatow	C												3		3	
India	C	12,350	6,461	5,914	10,817		7,436	15,870								
	D	6,507	3,606	3,371	5,866		4,345	10,403								
Bassein	C					3	1	1	2	3	4					
	D					2	1	1	1	3	2					
Bombay	C				4											
Calcutta	C	138	202	269	354	137	165	165	180	194	175	142	98			
	D	90	110	153	220	85	118	118	93	125	107	83	57			
Negapatam	C	1	12												1	
	D	1	4												1	
Rangoon	C	6	3	3	2				1		5	2	2	1		
	D	5	3	1	2				1		1		2	1		
Tuticorin	C	35	3													
	D	9	1													
India (French):																
Chandernagor	C	1		4	1	1	2		3	2						
	D	1		2	3			4	1	1	4					
Karikal	C	1		4	12		1									
	D			1	9		1									
Indo-China (see also table below):																
Pnompenh	C	3	11	9				2		1				5		
	D	3	8	7	6						2	2	1	1		
Saigon and Cholon	C	1	2	5	14	17	12	19	28	59	40	48	13	17		
	D	1	2	4	6	10	10	13	22	43	27	24	7	11		
Philippine Islands:																
Bulacan Prov.—Malolos	C													1		
	D													1		
Cebu—																
Bantayan	C													3	8	53
	D													3	7	28

[illegible]	D														1	1
Santa Fe	C													1		
	D													1		
Leyte Prov.—Maripipi	C														1	15
	D															11
Manila	C											[1] 1	1			
Negros—																
Bacolod	C															9
	D															8
Cadiz	C												10	2	10	
	D												7	1	5	
Escalante	C													1		
	D													1		
Hays Calatrava	C															3
	D															2
San Remigio	C															3
	D															2
Talisay	C															7
	D															7
Pampanga Prov.—Angeles	C															1
Rizal—Navotas	C													1		
	D													1		
San Antonio	C														1	
	D														1	
Siam	C	11	3	7	1	8	7	3		12	4	6			1	
	D	2		1		6	3	2		10	2	2			1	
Bangkok	C	9	3	2	2	1	5	4	5			6	3	5		
	D	1			1	1	2	1				2	1			
Nagara Pathom	C			1				4	6							
	D			1				2								
On vessel:																
S. S. at Suva, Fiji Islands	C			1												
S. S. Sutley, at Batavia, from Calcutta	C			1												
S. S. Sassari, at Massoua, from Jeddah	C												1			
	D												1			
On small boat at Port Cebu, from Bantayan Island	C													1		
	D													1		

Place		December, 1929	January, 1930			February, 1930			March, 1930			April, 1930			May, 1930	
			1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20
Indo-China (French) (see also table above):																
Annam [1]	C		1			2	2			32				60		20
Cambodia [2]	C	41	71		76	41	3	46	49	32		18	6			31
Cochin-China [2]	C	46	67		110	64	39	21	5	22	55	48				221

[1] Reports incomplete.

[2] Diagnosis not confirmed.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930 12	April, 1930 19	April, 1930 26	May, 1930 3	May, 1930 10	May, 1930 17	May, 1930 24	May, 1930 31	June, 1930 7	June, 1930 14	June, 1930 21
Argentina:																
Andalgala.[1]																
Rosario	C		P													
Sante Fe	C		6													
Villa Lia	D			2												
Azores: Ponta Delgada	C	P														
Brazil:																
Rio de Janeiro	C		1													
	D		1													
Sao Paulo.[2]																
British East Africa (see also table below):																
Tanganyika	C			7			11	33								
	D						10	10								
Uganda	C	127	82	47	98	27	20	23								
	D	112	70	43	87	27	19	21								
Ceylon:																
Colombo	C	2	4	3	4			1		4	1		1			
	D	1	4	3	4			1		3	1		1			
Plague-infected rats			1	3	2	2			2							
Chile: Antofagasta	C		1	1	1				1							
	D				2				1							
Dutch East Indies:																
Batavia and West Java	C	286	167	153	121	27	16	20	1							
	D	280	164	150	122	27	16	20								
Plague-infected rats			3	3	[illegible]		6	2				3	2			
Celebes—Makassar	C		1													
	D		1													
Plague-infected rodents		4														
East Java and Madura	C	2														
	D	2														
Java and Madura	D	458	317	296	223	59	40			8						
Ecuador (see table below).																

Egypt:																
Alexandria	C	2	4	1	4			1	1	2	3	3	5	3	6	6
	D	3	1		1			1	1			1	2			2
Assiout	C	4						7	7	3	9	2	6	4	2	3
	D	2						3	2		3	1	1		1	
Assuan	C	2														
Beheira	C		2		4											
Beni Suef	C				4											
Dakahlieh	C	1		8	5	2		1	2	3	1	2	5	1		
	D	1			1						1	1				
Gharbieh	C	2	1					1								
	D	1						1								
Girga	C					1										
Minieh	C											6	1	1	1	4
	D												1		1	
Port Said	C					1					1	1		1		
Greece (see also table below):																
Patras	C				1											1
Piraeus	C		1													
Pyrgos	C				1											
India	C	4,713	4,814	5,639	4,687		343	735								
	D	3,693	3,308	3,949	3,344		229	517								
Bassein	C		1		3											
	D		1		1											
Bombay	C		1	1	7		4			4	1					
	D		1	1	5	1	3	4		1	4					
Plague-infected rats		29	28	31	86	20	28	25	35	23	39		19			
Madras Presidency	C	336	27	230	157	12	15	9								
	D	174	13	140	57	6	8	4								
Rangoon	C	3	3	7	3		3		2		1	3				
	D	4	2	6	3		2	1	1	1	1	1				
Plague-infected rats			1	7	3	1	2		1	1	3	1				
India (Portuguese)	D									7						
Indo-China (see also table below):																
Pnompenh	C		1			2			1	1			2			
	D		2	13	13	2	1	1				1				
Saigon and Cholon	C	1	2		1					1				1		
	D	1	2		1											
Iraq:																
Baghdad	C	2	6	6	7		2		4	7	11	7	12	12		8
	D	1	2	1	4				2	3	5	4	6	7		5
Basra	C	1														
Naudham	C	1														
Japan: Osaka (vicinity of)—Plague-infected rats		1	7	6	4	1	1	1								
Kwang-Chow-Wan	C		25	25	7											
Madagascar (see also table below):																
Tamatave	C	4					1									
	D	3														
Morocco	C	12	4	48	55	14	41	34	32	19	22	18				
	D			13	18	6	26	12	11	11	14	6				

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.

[2] 21 cases of plague with 8 deaths were reported Jan. 29, 1930, in the State of Sao Paulo, Brazil; 15 of these cases were in the city of Sao Paulo.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	April 19	April 26	May, 1930: 3	May 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21
Nigeria: Lagos	C	15	6	7	13					1	1					
	D	15	6	7	5					1	1					
Plague-infected rats		18	44	42	25	3		1		1						
Senegal (see table below).																
Siam	C	11	8	17	16	4		1								
	D	9	6	13	15	4		2								
Bangkok	C	1		1	5						1	1	3			
	D	1		1	4						1		3			
Nagara Pathom	C	6	7	5	1	4	3	2	1							
	D	5	7	6	1	4	3	1	1							
Nagara Rajsima	C	2	2	2	1		1									
	D	1			1		1									
Syria: Beirut	C														1	
Tunisia:																
Sfax district	C	14	18	22				1		17						
Tunis	C	42	6	5	1											
	D	21												1		
Union of Socialist Soviet Republics:																
Kazaks	C	P														
Salsk Region	C													1		
	D													1		
Stavropol Region	C													1		
	D													1		
Union of South Africa:																
Cape Province	C		1	2	1											
	D	7		1	1											
Orange Free State	C	5	15	11	5	1										
	D	1	9	3	3											
Transvaal	C		8	2	1											
	D		3		1											
On vessel:																
At Rio de Janeiro, Brazil, from Argentina	C		1													

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
British East Africa (see also table above):							
Kenya	C	54	34				
Uganda	C	216	184	109			
	D	199	155	99			
Ecuador: Guayaquil	C	17	4	2	2	0	
	D	6	2	2		0	
Plague-infected rats		13	4	2	2	0	
Ecuador (outside of Guayaquil)	C	19	4				
	D	5	2				
Greece (see also table above)	C	1				1	
Indo-China (see also table above)	C	10	10	30	27	4	
Madagascar (see also table above)	C	264	282				
	D	248	258				
Ambositra Province	C	111	128	49	25		
	D	96	111	41	20		
Antisirabe Province	C	16	26	22	38		
	D	16	25	22	36		
Itasy Province	C	19	31		4		
	D	16	31		4		

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
Madagascar—Continued.							
Miarinarivo Province	C	3		25	14		
	D	3		25	14		
Moramanga Province	C	12	22	7	5		
	D	12	21	4	5		
Tamatave Province	C	2	3				
	D	2	1				
Tananarive Province	C	97	88	110	52		
	D	98	83	107	52		
Senegal:							
Baol [1]	C	5			18	24	13
	D	2			8	12	11
Dakar [1]	C	8				2	52
	D	1				2	42
Louga [1]	C			2		33	54
	D					10	27
Thies [1]	C		3		3	12	21
	D				2	9	8
Tivaouane [1]	C		1		11	71	135
	D				8	38	69

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21
Algeria:																
Algiers	C		6	1	5	1					1					
Constantine	C		1													
Oran	C		5		1											
Arabia: Aden	C	1	1	2	3			1								
Bolivia: La Paz (see table below).																
Brazil: Rio de Janeiro	C	1														
British Borneo: Sarawak	C		4	19												
British East Africa (see also table below):																
Tanganyika	C	27	5	49	103											
	D	5		8	7											
British South Africa:																
Southern Rhodesia	C	33	1	6								42				
	D	6										8				
Canada:																
Alberta	C	16	22	4	10	3	1									
Edmonton	C	15	19	1	4	3										
British Columbia—Vancouver	C	17	16	16	20	8	1	5	3			2	2			
Manitoba	C	8	6	2	4	2			2			7	3			
Ontario	C	51	63	86	100	17	30	18	12	14	24	24	20			
Fort William	C		4													
North Bay	C		2	1						1						
Ottawa	C	7	10	11	19	8	4	7	2	3	10	7	5	6		
Toronto	C		2									3	1	2	1	1
Quebec	C	3	11													
Montreal	C		1													
Saskatchewan	C	61	86	76	47	3	10	7	21	20	6	10				
Regina	C	31								1		3				
Ceylon:																
Angoda, Western Province	C			10					6							
	D			1					2							
Colombo	C	1	1	3												
	D			2												

China:																
Canton	C	5	7	11	6		2	1								
	D		2	3	2	1	1		1							
Chungking	C	P	P	P		P	P	P	P	P						
Foochow	C	P	P	P			P		P							
Hong Kong	C	102	118	62	38	20	7		1	5	5	2				
	D	73	109	51	25	11	9	3		4	2	3				
Manchuria—																
Harbin	C	1	3				1									
Kwantung—Dairen	C	1	6	5			1			1		7				
Nanking	C	P	P	P	P	P			P	P						
Shanghai—																
Foreigners only	C	7	5	2	2	2	1				1					
Including natives	D	6	8	7	10	4	3	2	1		1	2	2			
Swatow	D	2	3	6	6	2			1	1						
Tientsin	C	2	1	1	2	1			1	1						
Chosen (see table below).																
Colombia:																
Baranquilla	C	1		102	2	1										
Buenaventura	C	13		1		7	5	2	1	2		1	1			
Costa Rica:																
Port Limon	C					1	1	2	2				2	2		
San Jose [1]	C				10	7										
Curacao (alastrim)	C				14			1	1	2						
Dahomey (see table below).																
Dutch East Indies:																
Belawan Deli	C	1														
Borneo	C		1		185	17	43	20	10							
	D		1		12	16	12	2	1							
Java—																
Batavia and West Java	C	17	14	14	78	30	25	8	1	1		5	1			
	D	10	7	7	6	6	1	3	1	1			2			
East Java and Madura	C															
Sanggi Islands	C	17	25	12	5											
	D	3			1											
Sumatra	C	1	2		48											
	D				5											
Egypt: Port Said	C		2			1					1					
Great Britain:																
England and Wales	C	1,005	1,455	1,530	1,700	423	345	353	306	462	324	304				
Ashton under Lyne	C	3	4	29	15	9	3	4	2	6	3	4				
Bradford	C	8	5	2		1			2		1					
Cardiff	C				2	1	2									
Leeds	C		6	11	16	1	1									
London	C	480	597	699	710	169	169	129	137	222	138	148				
London and Great Towns	C	799	1,101	1,156	1,239	308	264	265	229	339	250	235				
	D		2	5	3	2	1	1								
Sheffield	C				8	1	1									
Stoke-on-Trent	C	12	12	41	122	17	23	33	12	19	9	13				
Greece: Patras	C	1														
Hedjaz	C	11	11													

[1] 5 cases of smallpox were reported Apr. 14 in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930 12	19	26	May, 1930 3	10	17	24	31	June, 1930 7	14	21
India	C	12,789	26,524	36,036	39,329		7,786	8,385								
	D	3,730	6,186	7,710	9,109		1,543	1,779								
Bombay	C	119	342	638	718	143	114	89	84	52	68	58	40			
	D	57	164	314	431	88	78	64	44	33	49	44	35			
Calcutta	C	88	185	399	361	153	116	122		109	70	52	71			
	D	62	130	287	305	124	97	103		94	72	40	52			
Cochin	C	234	234	184	291	56	49	58	20	13	8	7	9			
	D	20	27	29	35	3	4	6	2	5	1	2				
Karachi	C	17	30	38	33	10	9	7	4		6	7	1			
	D	11	9	16	47	10	3	2	2	2		1	1			
Madras	C	85	105	159	173	55	26	27	25	24	13	15	20			
	D	16	16	29	36	6	6	5	10	4	5	6				
Moulmein	C	18	65	143	146	10		33		27	29	20				
	D	9	18	40	41	4		3		4	6	5				
Negapatam	C			1								1				
Rangoon	C	2	7	7	10		1	1	2	2		3	1			
	D		4	2	5					1						
Tuticorin	C		3									5				
Vizagapatam	C	2	5	9	69	1		2	3	3	1	1				
	D			1	18	1			1		3					
India (French):																
Chandernagor	C		3	11	6	4		6		6	2	8	8			
	D			5	2			2		2	4	1				
Karikal	C		3	12	24	8	9	2		6	5	1				
	D		3	8	7	3	3	2		2	1					
Pondicherry Province	C	20	22	52	21	12	1	11		9	13	10	8			
	D	19	19	40	13	11	1	8		7	12	10	7			
India (Portuguese)	C		16	50	38	5	6	15	17							
	D			6	2			5	3							
Indo-China (see also table below):																
Pnompenh	C									1		1	1			
	D		1				1	1								
Saigon and Cholon	C	4	3	4	3			4	1	1						
	D	2	3	2	1		1	3	1		1		1			

Iraq:																
Baghdad	C	16	7	3		1	2	3	2					1		
	D	5	3	1					1							
Basra	C			1					1							
Mossoul Liwa	C	80	26	12			22			13		8				
	D	3	7	2			3			2		1				
Ivory Coast (see table below).																
Jamaica	C												2			
Japan: Tokyo	C								1							
	D								1							
Macao	D			2	3	1			1	1						
Mexico (see also table below):																
Jalisco (State): Guadalajara	D	9	9	14	22	6	4	8	2			6	1	4		
Juarez	C	3	2	3	2											
	D	2	1	1												
Mexico City and surrounding territory [1]	C	25	30	38	106	36	19	20	24	30						
	D	4	7	21	31	14	8	14	11	6						
Morelos State.[2]																
Progreso	C											1				
	D											1				1
San Luis Potosi	C			1												
	D			1												
Morocco (see table below).																
Netherlands: Rotterdam	C	1														
	D															
Nigeria (see also table below): Lagos	C	2	5	2	1	1										
	D	1	2													
Persia (see table below).																
Philippine Islands: Sarangani and Balut Islands [3]	D	40	18	3												
Poland	C	2		2				2	5		1					
Portugal: Lisbon	C	6	4	7	7	2	3	3		6		2				
Rumania	C		1	1	2											
Siam	C	42		2		2	2	2	2	2						
	D	9	1				2	2								
Somaliland, British: Boales	C	5	35	19	2											
	D	9	8	2	6											
Straits Settlements	C		2		5	2	1		2	1	3	2				
	D		1		1	1			1		1	1				
Sudan (Anglo-Egyptian)	C	290	230	79	60	2	9	31			5	13	1	4	8	1
	D	65	34	6	5	1		3				1	1			
Sudan (French) (see table below).																
Syria (see table below).																
Tunisia: Tunis	C	20	7	3	3			1	3							
Turkey (see table below).																
Union of South Africa:																
Cape Province	C	P	P	P	P	P		P								
Natal	C															
Orange Free State	C	P	P	P	P											
Transvaal	C	P	P	P	P											

[1] During the month of March, 1930, 100 cases of smallpox were reported in Mexico City, Mexico, and surrounding territory.
[2] Newspaper reports of Feb. 4 show an epidemic of smallpox in Ionacatepec, Morelos State, Mexico, and vicinity giving 600 deaths in preceding 2 weeks.
[3] On Feb. 1, 1930, 317 cases of smallpox with 102 deaths were reported to that date in the Sarangani and Balut Islands.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21
Upper Volta	C			26	2	2		1								
Zanzibar	C				13											
On vessel:																
S. S. Tairoa, at Liverpool, from London	C			1												
S. S. Karagola, at Zanzibar, from India	C		4													
S. S. Karagola, at Lourenço Marques, from India	C			1												
S. S. Elysia, at Port Sudan, from Bombay	C						1									
S. S. Naldera, at Port Said	C									1						

Place		December, 1929	January, 1930	February, 1930: 1-10	11-20	21-28	March, 1930: 1-10	11-20	21-31	April, 1930: 1-10	11-20	21-30	May, 1930: 1-10	11-20	21-31
Belgian Congo	C	74													
	D	4													
Dahomey	C	19													
Indo-China (see also table above)	C	142	460	148	286				26	261				173	132
Ivory Coast	C							7							
Sudan (French)	C	17	229	12	P	201		200	409	371		150	40	16	178
	D		25	1		10		18	31	30		6	7		18
Syria: Beirut	C	25	70	4	7	7	4	8	5	10	2	7			
Taiwan: Taihoku	C				31	12	31	12	15	10	2				

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
British East Africa (see also table above):							
Kenya	C	168	12	12	6		
Chosen	C		1	4			
Mexico: Durango (see also table above)	D	4	12	6	5	4	
Morocco	C	84	29	74		10	
Nigeria	C	293					
	D	70					
Persia	C	P					
Turkey	C	883	215	114		3	16
	D	457	66	42			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Week ended— March, 1930: 15	22	29	April, 1930: 5	12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14
Algeria:																		
Algiers	C	14	3	4	2	1		3	2	3	2	1	1	2	4	8	2	
Constantine Department	C	2	4	5	2	3		6	4	9	2			4		2	11	
Oran	C		2													3		
Arabia: Aden	C				1													
	D				1													
Bulgaria	C	41		13	9				15				1		5			
	D	2		1					1				1					
Sofia	C		1															
Chile:																		
Talcahuano	D		1															
Valparaiso	C		1															
China:																		
Manchuria—Harbin	C			1				4	5		20	27						
Shanghai	C				1													
Tientsin	C	1	1															
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C										1							1
Assuan	C	9																
	D	1																
Beheira Province	C	7	14	18			2				2			21	9	10	17	
	D			5										4	4	1	1	
Cairo	C			5														
Dakahlieh	C	11																
	D	2																
Port Said	C		2	1														
Suez	C		1															
Great Britain: Scotland—Glasgow	C													1				
	D													1				
Greece (see table below).																		
Iraq: Baghdad Liwa	C	1						2										
	D	1																

Ireland:																		
Irish Free State	C	1																
Ballina—Mayo County	C															2		
Dingle—Kerry County	C										3	2						
Swinford—Mayo County	C													7	7			
Northern Ireland—Cookstown	C			3														
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico: Mexico City, including municipalities in Federal District	C	6	12	9		2	1	1	2	1		1						
	D	2	4				1		2	1		1						
Morocco	C	6	23	21	4	7	14	13	6	5	3	1	3	6	1	1		
	D						4	3	2	1								
Palestine	C			1	1	1	2	2		1				2			2	
Poland	C	61	296	183	69	54	43	61	59	64	53	67	64	45	34	28		
	D	4	21	8	5	2	2	4	4	2	3	6	2	2		1		
Portugal:																		
Lisbon	C											4						
Oporto	C			1		2			1									
Rumania	C	82	241	293	90		95											
	D	5	25	23	7		5											
Tunisia	C	2		3									2		1			
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P		P	P	P								
Natal	C	P	1	3				P	P	P	P							
Orange Free State	C	P	P	P	P	P		P										
Transvaal	C								P	P	P							
Yugoslavia (see table below).																		

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
Chosen: Seoul	C	1		17			
Czechoslovakia	C		10	2	42	29	
France	C	1					
Greece: Athens	C	6	12	6	3	1	
Latvia	C	2	18				

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
Lithuania	C	5	2	70	62		27
	D	1		5	4		
Turkey	C	4	2	3	1	3	
Yugoslavia	C	6	26	33	46		
	D	1	3	5	2		

YELLOW FEVER

On April 22, 1930, two cases of yellow fever were reported in Mage, Brazil, located on the Leopoldina Railway, between Rio de Janeiro and Nichtheroy; one case of yellow fever was reported in Campos, Rio de Janeiro Province, Brazil, on May 23, 1930; and one case of yellow fever was reported in the Gold Coast during the week ended December 21, 1929. A case of yellow fever was reported in Monrovia, Liberia, on June 3, 1930.

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UNITED STATES TREASURY DEPARTMENT

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Report on a Public-Health Survey of Iowa

Coagulation Conditions and Bacterial Efficiency of Preliminary Water Treatment

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 45 JULY 11, 1930 NO. 28

A PUBLIC-HEALTH SURVEY OF IOWA

By A. J. McLaughlin, *Medical Director, United States Public Health Service*

A public-health survey of a State to-day means much more than a survey of the State health department. The field of public health has expanded to include the work of many agencies, official and unofficial, which operate independently of the health department. To understand this expansion and the necessity for including these other agencies, a brief consideration of public-health evolution is necessary.

Public health evolution.—The first quarantines at Ragusa, Marseille, and Venice in the fourteenth and fifteenth centuries were based on the psychology of fear. They were efforts to prevent the introduction and spread of epidemic diseases. Our first boards of health were born of fear and hope—fear of pestilence and hope that quarantine and isolation would prevent the spread of epidemic diseases. With this origin it was natural that these boards of health should be given unusual police power and definite control of the individual for the good of the community. The early administrative health officers depended upon police power alone, and they were, in effect, policemen.

The epoch-making discoveries of Pasteur, Koch, and others from 1870 to 1890 gave a new impetus to the vigorous application of police power. The demonstration that disease was caused by frail, easily-destroyed germs was responsible for the new vigor which marked the application of quarantine, isolation, and disinfection in the last decade of the past century. With the beginning of the twentieth century came the knowledge of the carrier. It was shown that even if doctors reported all cases under their care there would be as many more uncontrolled. Mild cases, atypical cases, and carriers who had no symptoms whatever could not be controlled by quarantine, isolation, or any other exhibition of police power. This new knowledge made health officers realize that control of the communicable diseases was possible only by the voluntary cooperation of the individual citizen, and that this cooperation could be secured only by education in personal and family hygiene. Public-health education became even more essential to the health officer as his field of work expanded to include noncommunicable diseases and the improvement and conservation of health. Health officers gave up the idea that all public-health work

could be done by personnel on the pay roll of the health department. It was obvious that the education of individuals in personal hygiene and the securing of their voluntary help in preventing disease involved the participation of many agencies, official and unofficial, outside the health department.

In the first decade of this century unofficial voluntary agencies undertook public-health activities of great importance and wide scope and boards of education developed plans and procedures in school hygiene. The responsibility for the health of the people was still squarely placed upon the shoulders of the health officer, yet a large part of the work necessary to discharge his obligation had to be done by personnel not under his direct control. The health officer, therefore, evolved from a policeman, vainly striving to stamp out epidemic disease, into a constructive statesman, courteous and persuasive, who could weld together in one machine the forces engaged in public-health activities.

The policy of a health officer to-day.—In discussing the simple fundamentals of public-health administration, omitting details, it is possible to consider the health officer, Federal, State, and local, in general, because not only are the obligations and objectives similar, but the policy of administration in discharging these obligations and attaining these objectives is essentially the same for all health officers, whether their jurisdiction is over a county, a city, a State, or the United States as a whole. A health officer, therefore, regardless of his jurisdiction, must secure the active participation of the organized medical profession, the unofficial voluntary agencies, and the boards of education, and utilize them to carry out certain parts of his comprehensive program which would not otherwise be possible because of lack of funds and personnel in the health department.

The health officer should secure the active participation and support of the organized medical profession by means of a special advisory committee on public health appointed by the medical society. This committee would not conflict with an existing board of health. The official board of health, by law and ordinance, must pass upon all police measures and also upon questions of policy. An advisory public-health committee would advise and approve measures to be carried out by the medical profession not depending upon law and ordinance. The health officer must be enough of a statesman to secure such advice from the medical society and to bring his board of health to approve of such measures.

The health officer can do much to encourage the local medical society to accept its collective obligation, to solve its greatest problem—scientific medical service, including preventive advice and treatment for all the people at a cost within their ability to pay. The furnishing of such facilities for treatment by the medical society will

give early preventive and corrective treatment to the preschool child, a field in which at present the health officer is scarcely able to scratch the surface.

No health department now has, nor can it hope to have, sufficient funds to finance all health work. Voluntary health agencies simply add to the total health department budget large sums for public-health work which they are now doing or which should be developed. It is the duty of the health officer to have a complete comprehensive plan for all health activity. He should include these voluntary health agencies in that plan, allotting to them work which he is unable to do and which they are ready and willing to do. It is the custom, where the best utilization of the voluntary agencies is secured, to have a committee of voluntary health agencies, with representatives of every agency engaged in any public-health activity.

The health officer will find that in the promotion of the health of school children a considerable part of his work will be done for him by the board of education. The amount of work done by boards of education in this field varies in the cities. In a survey of 98 of the largest cities of the United States it was found that 23 had organized the work under the health department and 57 under the department of education, and 18 had some joint arrangement between the health and education departments. There is a third factor in cities, viz, the parochial schools. This complex situation calls for the qualities of statesmanship which a good health officer should possess. He must accept what is being done and dovetail it in with his own child-hygiene program. The main objective is to get the work done, and the matter of who shall do it is of lesser importance.

With the experience of the past three decades, it is not a difficult matter to set down on paper an outline of organization in detail of a State health department with the major divisions it should possess. Iowa's failure to organize earlier in such a manner is not an unmixed calamity, as modern reorganization can now be effected, and profit can be had from the experience and mistakes of other States.

Much more important, and also more difficult, is the scheme of organization which will afford a sound foundation for such a department, by welding together in a comprehensive whole all the public-health activities of the State, official and unofficial.

To organize the department in detail, with all its divisions and sections, without some sound method of utilizing in a joint program all the other official and unofficial agencies, is comparable to building a fine structure on a foundation of sand.

I shall, therefore, make this report in two sections, as follows:

Section I.—Organization of the department with the objective of including all public-health work now being done within the State, official and unofficial, in a comprehensive program. The correlation

of these other official and unofficial agencies, and the coordination of their work with the department of health will afford the sound foundation necessary for the proper reorganization and development of the department itself.

Section II.—The reorganization of the department of health into the divisions necessary to enable it to discharge its obligations and function properly in the enlarged program.

Section I.—Organization of Outside Agencies

In formulating a plan for utilizing all agencies engaged in public-health activities outside of the department of health in a comprehensive joint program with a single direction, it is necessary to study carefully the work and potentialities of three factors, viz:

1. The organized medical profession.
2. The State educational authorities.
3. The unofficial health agencies.

THE ORGANIZED MEDICAL PROFESSION—THE STATE MEDICAL SOCIETY

The following are the two greatest defects in public-health administration to-day:

1. The failure to more than scratch the surface in the most important field of public health, viz, the hygiene of the preschool child.
2. The lack of properly organized local health units to apply, locally, the policies of the State health department.

Adequate supervision of the preschool child in any considerable percentage of the total children can be secured only by the activity of the individual practicing physician.

Laudable efforts are made through parent-teacher associations, baby welfare stations, and public-health nurses, but the percentage of children reached is small. We must have a healthy public opinion demanding examination of the preschool child, with a county medical society establishing facilities to aid the practicing physician in responding to this demand.

In order to get for the preschool child early diagnosis, preventive advice and treatment, and correction of defects, we are compelled to focus as our primary objective upon the greatest problem confronting the medical profession to-day, viz: "How can adequate medical, surgical, and preventive advice and treatment be made available, within easy reach of all citizens, at a cost within their ability to pay?"

The layman has been educated and now knows that diseases can be prevented or their hazard minimized by early diagnosis and treatment. The average citizen, for financial reasons, does not consult a doctor until he is definitely ill, and very often postpones calling the doctor until he is confined to bed. It is not the cost itself, but the

lack of definite knowledge of what that cost may be. More important still, in smaller cities and towns there is an absolute lack of clinics and out-patient departments. Many careless statements and inaccurate generalizations are made in regard to the cost of medical care. In the larger cities clinics and out-patient departments have developed independently of the medical society as a unit. For this reason the trite statement is often heard that the poor in large cities and the rich anywhere can secure the best medical service, but that for the intervening classes such treatment is not available.

The cost of the best medical care, where available, is worth what is paid for it. The cost has not increased in greater proportion than the cost of other services; but medical and surgical diagnostic and treatment facilities have been elaborated to include many new procedures, worth their cost, which were not included years ago. The greatest problem is not the cost but the absence of facilities for modern diagnosis and treatment at a definite known cost.

It is the collective obligation of the organized medical profession to solve this great problem. The American Medical Association has recognized this collective obligation, and every county medical society is urged to accept its problem and discharge its obligation. In the large cities the problem is complicated by group clinics, industrial clinics, and other installations outside the control of the medical society. In the smaller cities the situation is less complex and the solution less difficult. Difficult or easy, the solution should come from the medical society. The demand for these services is based upon sound public opinion and must be satisfied by some agency. Protracted delay in grappling with this problem, seizing the initiative, and establishing such facilities can result only in makeshift clinics established by institutions and agencies independent of the organized profession or by quacks and charlatans. The installation of pay clinics by the medical society, or with the seal of its approval, gives the individual citizen valuable aid in avoiding the so-called clinic of the quack and charlatan.

The pay clinic either with a fixed rate or a sliding scale is a response to the demand of public opinion. The organized medical profession has been reluctant to take any steps to respond to the demand. Such clinics have been established by individuals or groups of doctors, in connection with hospitals or medical colleges, or by endowments or foundations. Unfortunately, this insistent public demand has been capitalized by quacks and fakers who often establish clinics with elaborate and very impressive equipment.

The development of facilities for early diagnosis and early treatment by the organized medical profession at a known cost is, frankly, socialization of the practice of medicine. Such socialization is inevitable. It rests with the profession whether it shall seize the

initiative and satisfy this demand or stand passively by and be compelled to submit to the process while it is carried out by outsiders.

State medicine may not come as a result of inactivity of the organized profession, though it is always a menace; but a gradual evolution, a haphazard growth in which the organized profession is inactive and inarticulate, will produce a chaotic condition which may be even worse than State medicine.

The county medical societies must provide out-patient departments or clinics where examination, early diagnosis, and treatment of ambulatory cases can be made. Usually there is a small hospital which can be equipped and expanded for this purpose. It should be organized on a business basis, dividing the clientele into the following classes:

1. Indigents, to be paid for by the county.
2. Those unable to pay full fees, but who can pay something, according to income.
3. Those able to pay full fees.

A county medical society which organizes for public-health work by establishing facilities for early diagnosis and treatment and by fostering a full-time county health unit, will be rendering its greatest contribution to public service. Without active participation by the local medical society as a unit, county health work is extremely difficult and generally a failure.

Enthusiastic workers who are poor waiters often attempt county public-health organization without this active participation by the county medical society. Such efforts are doomed to failure. You can not build successfully and permanently in advance of public opinion, and the most important factor in public opinion in public-health progress is the collective dictum of the medical society. If this active participation of the county medical society can not be secured, then attempts to organize in that county should be deferred until public opinion brings about the desired change of attitude. No public-health work should be initiated in any county except through the direct approval and action of the medical society as a unit.

These facts bring to the State medical society tremendous responsibilities and duties. It is through the initiative of the State society that these activities of the county medical societies will be begun and carried to fulfillment.

In accepting the solution of this great problem as its collective obligation, the State medical society pledges itself to stimulate and assist the county medical societies in discharging this obligation as rapidly as the local units are able to establish these facilities.

It is not sufficient to have the best, most modern equipment and technical skill, in one or two large centers in a State. It becomes the

duty of the State medical society to arrange for the distribution of such equipment and technical skill by decentralization, by the establishment in county seats of such facilities where they are available and within easy reach of every citizen.

The fact that the problem is difficult and calls for executive ability, statesmanship, and energetic, collective action, does not alter the fact that it is the problem of the State medical society. It is not expected that the State medical society can achieve the ideal immediately, but many county medical societies are ready now; and following the example of these, within 10 years every county in the State could be so organized.

Incidentally, the improvement in facilities for practice in county seats would tend to solve another of the pressing problems, namely, the poor distribution of new graduates. The graduate of a modern, "class A" medical school to-day is accustomed to use the latest technique, methods and equipment for early diagnosis and treatment. He knows he will not find facilities for such practice in the small towns. He therefore avoids the county towns and crowds the large cities. If the practice of medicine could be made attractive in county towns by the establishment of modern facilities for early diagnosis and treatment by the county medical society, the young graduate would be very glad to practice in such towns.

I have conferred with the officers and leaders of the State medical society, with many local doctors in counties, and with the other leaders of medical thought in Iowa, and I have not encountered a single person who has not been sympathetic to the suggested policy of the organized medical profession.

With this assurance, the Iowa State Medical Society is going to be asked to make a formal declaration of policy, accepting this great problem as their collective obligation and pledging themselves to bring about the desired activity of county medical societies as rapidly and as thoroughly as possible.

STATE EDUCATIONAL AUTHORITIES

Chief among the State educational authorities which include public-health activities in their work are the following:

1. The State university at Iowa City.
2. The State college at Ames.
3. The State teachers college at Cedar Falls.

The public-health activities of the State university at Iowa City may be considered a part of its legitimate function of education. In no instance, in so far as I could determine, is there any activity which does not belong in the category of public-health education. These activities should not only be continued but should be expanded

far beyond their present possibilities, which are limited by inadequate appropriations.

The college of medicine receives appropriations which enable it to do the laboratory work, and bacteriological, serological, and water analyses for the State department of health. This arrangement should continue, for reasons of economy and lack of housing facilities, in the State department of health. This item will be further discussed in Section II.

The line of demarcation between the fields of activity of the university and the State department of health in maternal and child hygiene is clear. The work of the State department of health is administrative as befits the authority charged by law with the prevention of disease and the promotion and conservation of health. The work of the university is educational solely.

The following agreement was drawn up and signed by the commissioner of health, the dean of the medical school and the director of the extension division:

Inasmuch as there has been much discussion during the past two years in regard to overlapping and duplication in the departments concerned, the following proposed basis of relationship between the State university of Iowa and the State department of health has been formulated to clarify their distinctive and common spheres of activities in maternal and child hygiene.

FUNCTIONS OF THE STATE UNIVERSITY OF IOWA IN RELATION TO MATERNAL AND CHILD HYGIENE

1. Direct instruction of students of medicine, dentistry, nursing, welfare work, and education. Intramural instruction.
2. Indirect educational program for physicians, nurses, dentists, and welfare workers through extramural instruction.
3. Studies in all fields of health and disease relating to children and mothers, research, contributions to knowledge, investigative work; for example, the work of the child welfare research station.

FUNCTIONS OF THE STATE DEPARTMENT OF HEALTH IN RELATION TO MATERNAL AND INFANT HYGIENE

1. Control of communicable diseases.
2. Registration of births.
3. Organization and guidance of local units for administrative enterprises; for example:
    A. Promotion of plans to have every child receive periodic examination.
    B. Promotion of plans to insure a sanitary supply of milk.
4. Sanitary laws—inspection and enforcement.
5. Immunization against diseases.

COMMON FIELDS OF ACTIVITY OF THE STATE UNIVERSITY OF IOWA AND THE STATE DEPARTMENT OF HEALTH, PREFERABLY TO BE COORDINATED AND COOPERATIVE

1. Publications.
2. Health education of a popular character covering the field of maternal and child welfare.

This agreement outlines fairly and clearly the limits of each field.

Splendid work is now being done by giving courses to doctors in obstetrics and pediatrics. The course consists of lectures. No clinics are held, and the work is purely in the nature of postgraduate instruction. These courses are extremely valuable in maternity and infant hygiene, and the appropriation to the university for such work should be increased.

A very fine piece of public health educational work is being done under the dean of the dental school. The bureau of dental hygiene gave 310 talks to an aggregate audience of over 17,000—dentists, teachers, nurses, pupils, and parents—and visited 220 communities. This is very effective public-health education. It should be continued and expanded to larger proportions.

Very valuable research work is being done in child development and parent education, and summer courses are given by the extension division. The research station was established in 1917 and is the coordinating center for such work at the three State institutions, the State University, the Iowa State College, and the State teachers college. Nutrition, mental hygiene, and other phases of this work are of great interest to the State health department. There are other educational activities, legitimate functions of the extension division, of keen interest to the health department. For these reasons some means must be devised for keeping the department of health in touch with these phases of public health education work.

Medical colleges have one tremendously important duty and function in relation to public-health administration. It is the establishment of an adequate and more effective system of teaching preventive medicine and hygiene to the undergraduate medical students. The present practice varies in different colleges. Most schools have either a professor of preventive medicine or some one delegated to give lectures on this subject. In regard to adequacy and effectiveness, the major defect is a lack of practical demonstration. Teaching consists of didactic lectures, the material for which is found in any textbook on hygiene. What is needed is a close affiliation with a health department, where the student can see preventive medicine in actual practice. The student will remember much from actual demonstrations, but lectures alone are often ideal soporifics, in view of the fact that they produce sleep and have little after effect.

The desirability and need for this more adequate teaching of preventive medicine is obvious for many reasons. It is essential in his own interest that the student be adjusted to the change of accent in the practice of medicine from curative to preventive; but there are two very definite reasons why the public-health administrator desires this improvement in teaching:

1. There will be graduated to enter practice a body of young doctors who will understand the objectives and efforts of the health officer and will therefore be sympathetic and helpful.

2. Health officers at present are recruited from the practicing medical profession by political appointment. Their only knowledge of preventive medicine upon their first appointment is the instruction they have received in medical college. This has either been entirely neglected or consisted of a few lectures with no actual demonstration of public-health work. These men have to learn something entirely new, and in the process of learning will make many costly mistakes.

Some years ago it was hoped that postgraduate schools of public health would cover the need of trained health officers. This dream has not been realized. Our new appointees are not postgraduates in public health; they are ordinary practicing physicians, and appointees will continue to be such under our political system of government. Their training must come from actual experience in a health department or by short courses, and this is greatly facilitated by having a foundation acquired by an adequate undergraduate course in preventive medicine.

Just as the State department of health is vitally interested in the teaching of preventive medicine to the undergraduate medical students, the dean of the medical college is especially desirous of having the course in preventive medicine and hygiene made practical by demonstrations of applied preventive medicine as practiced by health departments. For this reason a model county health department should be established in Johnson County so that its work can be used for demonstration purposes in teaching preventive medicine to students.

The model health department in Johnson County is also necessary for postgraduate instruction for health officers and nurses, in summer courses, and during the regular school year.

The dean of the college of medicine is keenly interested in the problem of unequal distribution of doctors. He therefore is also interested in the wider distribution of high-grade medical service, by establishing centers with modern facilities and equipment in county seats. He can assist in this decentralization and, by making the small town more attractive for modern practice, secure a better distribution of the young graduates.

The dean of the medical college can, by means of public-health education activities of the university, assist in educating the public to demand early diagnosis and preventive and corrective treatment from the physicians for children from 1 to 6 years old. He can also render tremendous service by undergraduate and postgraduate instruction in preparing the doctors to respond to that demand.

The Iowa State College of Agriculture and Mechanic Arts is doing public-health work in several fields. This work in no way conflicts with, but on the contrary is very helpful to, the State department of health. Work in connection with production of milk, tuberculosis of cattle, undulant fever, examination and research in industrial wastes, and other fields should be continued and expanded by larger appropriations. Some means can be devised for correlating this work with the general public-health work of the State without disturbing its location or curtailing its activity.

State teachers colleges and normal schools have a wonderful opportunity for real service by more adequately teaching child hygiene to teachers. The lack of training in the practical application of child hygiene methods is a real handicap to public-health work in the schools. The need is most apparent in teachers of the first to the sixth grades and in the schools of the small city or county. In these situations it is not uncommon for one public-health nurse to be carrying an overload of 8,000 pupils. If the teachers are trained, they understand and are helpful; and in spite of the overload a creditable result is often obtained. The teacher is a very intelligent possibility in public health. She teaches hygiene and health habits and observes the children through the entire school day. Her training in hygiene is, therefore, one of the vital essentials in the health of the school child. Presidents of teachers' colleges have made very creditable efforts in many States to give good courses in health education. They have good textbooks and excellent instruction of a didactic type. With one or two exceptions, the same defect occurs which was charged to the teaching of preventive medicine in medical colleges, viz, too little practical demonstration of applied child hygiene. To correct this defect it is necessary to have a doctor and nurse trained in child hygiene on the faculty, and to have an arrangement with the city or town in which the college is located by which the city schools are used by the doctor and nurse to demonstrate to the students, in groups, the practical work of child hygiene.

The State teachers college at Cedar Falls is fortunate in its president, Professor Latham, who is thoroughly alive to the importance of adequate teaching of child hygiene to teachers. He is anxious that this teaching be made as practicable as possible, and to this end the State health department should organize Blackhawk County with a model county health department. This model health department could then be used for practical demonstration purposes to make the teaching of applied child hygiene to teachers more effective.

THE UNOFFICIAL HEALTH AGENCIES

The origin of unofficial voluntary health agencies and their development into great public health machines was due to two things: First, the restriction of official health work to an attempt to control communicable disease by police power alone; and, second, the demand of public opinion, based upon new medical knowledge, that new methods be tried, methods independent of police power and based largely upon education. The impatient desire to expand public-health work to include all diseases and to attack the communicable diseases directly by education of the individual citizens was a response to the seeming unwillingness of official health departments to expand and utilize other methods than those based on police power. The health officers were not unwilling to expand, but it was impossible to secure funds from official sources for untried methods, the efficiency of which had yet to be demonstrated.

The greatest contribution of the unofficial voluntary agencies was the demonstration in the first decade of this century that educational methods were effective in the prevention of disease and the reduction of death rates and that such methods were legitimate weapons for the use of official health departments. Thus, as pioneers, voluntary health agencies have been of great help to official health departments in demonstrating the value of new procedures and in financing these demonstrations when funds for such purposes could not be secured by the official health department.

These two separate movements advancing side by side, the expansion of official health departments and the development of voluntary health agencies, were bound to conflict, and at first there was misunderstanding, distrust, and antagonism. In the second decade much of this conflict had disappeared; and in the last decade the policy of unofficial health agencies in their relation to health departments has been so clearly defined, understood, and accepted that there is to-day no reason for conflict. This clarification of policy was brought about by conferences of health officials with the heads of the great national unofficial health agencies. It is now clearly understood that an unofficial health agency is an auxiliary of the duly constituted health authorities, with freedom of action in untilled fields, and the obligation to turn over to the health department any legitimate public-health activity whenever the health department can secure the funds to carry on the work. The voluntary health agency has another obligation; it is that when the health officer has a comprehensive program of public-health activity it shall accept and agree to carry out such parts of that program as are within its power. And so to-day the proper utilization of the voluntary public-health agencies depends upon the health officer himself. They increase the total budget for

public health far beyond the amount which the health officer can secure by official appropriations.

The Iowa Tuberculosis Association has a record of splendid achievement in public-health work in Iowa. It has, with its local units, a budget of about $125,000 annually. Because of the lack of funds and the consequent lack of personnel in the State health department, the Iowa Tuberculosis Society has had to carry, single-handed, a very heavy load. It has been active in chest clinics in conjunction with county medical societies and in assisting the bureau of dental hygiene of the University of Iowa and the oral hygiene committee of the State Dental Society in oral hygiene. It has furnished the services of Miss Countryman to the State department of health to supervise public-health nursing in the State and has been active in very effective popular public-health education.

The work of the organization would be even more valuable and effective if there were a better development of the State department of health in child hygiene and if more full-time county health units could be installed. This splendid organization does not receive from the seal sale the total which it should. With better organization in the State and county health departments, and with more active participation by the medical societies, the receipts from the seal sale could be doubled.

This, like similar organizations, should not and does not receive any money from the State legislature, but all official agencies and the organized medical profession should give their hearty support and indorsement so that the receipts from seal sales might be brought up to at least $250,000.

The Iowa Heart Association is financed by Christmas seal funds and the Iowa Tuberculosis Association rendered great assistance to the heart association in holding clinics, distributing literature, and other public health education work in heart disease.

NECESSITY FOR A PUBLIC-HEALTH ADVISORY COUNCIL

In the foregoing pages the principal agencies outside the health department which are doing or should be doing health work have been considered. How can the work of these various agencies be included in a general program and coordinated with the work of the official State health department?

Public health in its broad modern sense includes not only the activities of the State department of health, but the activities of these other official and unofficial agencies as well. One of the most effective ways of incorporating these activities in a comprehensive state-wide program of public health is to give them representation in some form of joint council, committee, or board.

State boards of health could be used to afford representation to these other agencies, but as a matter of fact are seldom so used.

In two States, Alabama and South Carolina, the State medical society is in effect the State board of health and so functions by means of a committee. Eleven States require all member of the board of health to be physicians, and 21 other States specify that a certain number of the board members must be physicians.

Massachusetts, New York, Connecticut, Ohio, Maine, and West Virginia have a public-health council, which functions chiefly as an advisory body to the commissioner of health, who is the executive head of the department. Even in the States where the executive power is vested in the board, it is the modern custom to delegate this power to the commissioner or State health officer, the board acting as an advisory council on matters of law, regulation, and policy.

With these facts in mind it is fair to assume that members of a State board of health should be appointed and hold their office by virtue of their ability to contribute technical or scientific advice or because they could coordinate with the work of the board activities of organizations which they represent.

The presence of physicians on the board partially carries out this idea, provided they are carefully selected for their qualifications or that they represent the organized profession.

The composition of the Iowa State Board of Health does not secure the desired result indicated above in either particular. The governor, the secretary of state, the treasurer of the State, the auditor of the State, and the secretary of agriculture are members ex officio. These are busy officials with neither the time nor the technical training necessary to make them useful on a board of health.

There are five members appointed by the governor, all doctors, not more than one from each congressional district. These may or may not be able to contribute advice on preventive medicine or public-health administration, depending on the care with which they are selected.

The responsibility for the health of all the people is placed by law on the State board of health and its executive, the commissioner of health. It is the commissioner's primary duty to formulate a comprehensive plan of public health for the State which will include activities now carried on by other departments of the State government, by the organized medical profession, and by unofficial voluntary agencies.

It is obvious, therefore, that in formulating such a plan and carrying it out, the commissioner would be greatly assisted by having the executives or authorized representatives of these other departments or agencies as members of his board, or of a public-health council.

Legislation can be enacted which would change the composition of the State board of health by providing for representation upon that

board of the agencies doing public-health work. Pending such legislation, the governor should appoint a special public health advisory council for the purpose of coordinating all State public health activities in one comprehensive plan. This council should consist of the following, designated by the governor:

1–5. Five members of the Iowa State Medical Association. (To be designated by the board of trustees of the State medical society.)
6. Chairman, oral hygiene committee, State dental society.
7. Dean of college of medicine, University of Iowa.
8. Professor, hygiene and preventive medicine, University of Iowa.
9. State superintendent of public instruction.
10. The president, Iowa State Teachers College.
11. Professor of hygiene, Iowa State College of Agriculture.
12. President, State veterinary society.
13. President, Iowa State Tuberculosis Association.
14. Director, extension division, University of Iowa.
15. Director, extension division, Iowa State College of Agriculture.

It should be understood that the commissioner of health should be a member of this council, and should preside over its meetings as chairman of the council.

Section II.—Internal Organization of the Department

The department of health will be considered as it now functions, then will be taken up the divisions it should have, and finally the minimum of a well-balanced department, organized into divisions, will be presented in budget form.

With the exception of a public-health engineering division, which is separated from the rest of the department, being housed on the fourth floor of the State capitol, and the State laboratories at Iowa City, all the miscellaneous activities of the State board of health are inextricably crowded together in an old frame dwelling house on the margin of the capitol grounds. That results of any value were secured was a tribute to the ability, amounting almost to genius, of the late commissioner, Dr. Henry Albert. Not only is expansion impossible in these quarters, but valuable records are in danger in what is a veritable fire trap. Therefore it is essential that proper quarters be provided at the earliest possible moment.

Plans have been made for a new State office building in which adequate quarters for the department of health are provided. This building is only in the blue-print stage and may not be available for four or five years. In the meantime, the need for adequate quarters is so urgent that the board of control should rent and furnish to the department, quarters in some office building pending construction of the new State office building.

Within the past year a beginning was made in developing a division of communicable diseases by the employment of an epidemiologist.

The mixture of heterogeneous activities connected with licensing the so-called professions adds to the confusion in the cramped space of what is really a general office. Of these licensing activities the Iowa Health Department is burdened with the most diversified list.

The list includes the following:

1. Medicine and surgery.
2. Dentistry and dental hygiene.
3. Nursing.
4. Pediatry.
5. Osteopathy.
6. Osteopathy and surgery.
7. Chiropractic.
8. Optometry.
9. Cosmetology.
10. Embalming.

The fees for these various licenses more than pay the cost to the State, but fees go into the general treasury and are not held by the department of health. Consequently a registrar at $2,400, a stenographer at $1,200, and two part-time clerks are paid out of health department appropriations when their time is given to licensing work. This work is only indirectly connected with health, and at some time in the future it will be transferred to a special division created for the purpose. At present it is a confusing factor and takes up considerable time of the commissioner.

Another activity added to the department by act of legislature is really supervision of nursing education. It is in no sense a public-health activity, but allots $3,000 salary to a nurse who visits and recommends classification of nurses training schools and other work in raising standards of nursing education.

The following is the budget appropriated for the department for the fiscal year ended June 30, 1930. It is divided roughly into three divisions—administration, communicable diseases, and public-health engineering.

DIVISION OF ADMINISTRATION

Director (commissioner of health)	$5,000
Chief clerk	2,000
Secretary to commissioner	1,500
Registrar of licensure	2,400
1 bookkeeper	1,200
2 stenographers	2,400
2 clerks, part time	800
1 nursing education supervisor	3,000
1 lecturer	3,600
1 assistant registrar of vital statistics	2,000
3 clerks at $1,200	3,600
Travel	2,500
Travel lecturer	1,500
	31,500

DIVISION OF COMMUNICABLE DISEASES

Director (deputy commissioner)	$4,000
1 epidemiologist	3,600
1 morbidity clerk	1,500
1 stenographer	1,200
1 antitoxin clerk	1,200
1 janitor clerk	1,200
1 part-time public health nurse, tuberculosis	2,000
Travel epidemiologist	1,800
Tuberculosis—travel per diem, tuberculosis consultants for clinics and printing	2,000
Contingent fund	4,000
Biologics	5,000
	27,500

DIVISION OF PUBLIC HEALTH ENGINEERING

Director	$3,600
1 assistant engineer	2,100
1 assistant engineer	2,000
1 junior engineer	1,800
1 chemist	2,400
1 stenographer	1,200
2 part-time inspectors	900
Travel	6,000
Laboratory equipment	1,000
Stream pollution equipment	$625
Motor transport	900
	22,525

SUMMARY

Division of administration	31,500
Division of communicable diseases	27,500
Division of public health engineering	22,525
Total	81,525

In considering the total budget appropriated for the health department for health work, it is fair to deduct from that total the following:

Registrar for licenses and clerical	$4,400
Salary nursing education supervisor	3,000
	7,400

Therefore, if we deduct $7,400 from $81,525, it leaves as the real appropriation for public-health work in Iowa the meager sum of $74,125.

In 1925 the per capita appropriation by State legislatures for health departments was 15 cents or more in six States—Delaware, Florida, Maryland, North Carolina, Massachusetts, and Rhode Island; it was 5 cents or more per capita in 38 States; in 10 States, the appropriation was less than 5 cents per capita, and Iowa was at the bottom of the list with only 2.4 cents per capita. The average for the 48 States was 9 cents. An increase in Iowa to 5 cents per capita should therefore be a very reasonable suggestion. This would give an annual appropriation of $125,000.

I shall use this modest, reasonable sum as a basis for the minimum total appropriation and consider a budget of this total divided into the necessary divisions in proportion to their importance and the dividends that may be expected from such expenditures in life saving, disease prevention, and health promotion.

I deem it wise to request the minimum of 5 cents per capita instead of the larger sum which Iowa should appropriate, because any reasonable legislature, in the face of the figures, would be inclined to grant this sum at the first request. After reorganization is effected and results are apparent, larger appropriations more nearly approaching the average in other States will follow. The present appropriation has been raised slightly from 2.4 cents in 1925 to almost 3 cents in 1930, and so the increase to 5 cents suggested is a very small sum for a purpose of such paramount importance as health.

DIVISION OF ADMINISTRATION

In the central office of most State health departments there is placed the clerical work incident to the administration of the department. This activity has to do with records and files, personnel and accounts, purchasing, etc. It is usually classed as a bureau or division of administration, although various other titles are used. In some States certain functions ordinarily discharged by special divisions are carried on in the division of administration. In 22 States, including Iowa, all department activities in public-health education are placed in this division. In departments not completely organized, new activities are often carried in this division until they grow sufficiently to warrant creation of a special division.

The amount of money spent and the percentage of the total department budget, therefore, varies greatly in the States. In the large, well organized departments, a smaller percentage of the total appropriation is spent for administration than in the States incompletely organized.

Probably not more than 15 per cent of the total should be spent for administration. Well organized States such as Massachusetts, Ohio, Alabama, and Maryland, spend less than 10 per cent for administration, while incompletely organized States such as Wyoming, Vermont, Maine, Arizona, and Iowa spend more than 40 per cent of the total appropriation for administration. This is because the total appropriation is low and, as indicated above, many activities are carried in this division which are charged to special divisions in other States.

On a per capita basis Iowa spends less for health than any other State in the Union. With increased total appropriation and better organization by forming the necessary new divisions, Iowa, instead of spending 40 per cent of the total, would allot probably less than 15 per cent for administration.

The division of administration will probably for some years be obliged to carry activities which have not developed sufficiently to warrant a special division. Such public health education activities as the department is able to undertake will have to be handled by the commissioner in his general office. He can have a committee of the proposed public health council to advise with him and correlate other public health education work with his. This committee should include:

The superintendent of public instruction.
The dean of the college of medicine, University of Iowa.
The director, extension division, University of Iowa.
The director, extension division, Iowa State College (Ames).
The executive secretary, Iowa Tuberculosis Association.
The president State teachers college, Cedar Falls.

The collective amount of public health education by organizations represented by the above committee is enormous. If the commissioner can coordinate and encourage expansion of this educational work on sound lines, he will achieve much more than he can by attempting to secure large sums for public-health education.

DIVISION OF VITAL STATISTICS

While the personnel engaged in vital statistics is small, it is a clean-cut unit and should be made an independent division with more space and one additional clerk.

DIVISION OF COMMUNICABLE DISEASES

Control of communicable diseases is the oldest activity of health departments. The first boards of health were created for the purpose of preventing and suppressing epidemics.

Advances in knowledge of epidemiology and preventive medicine have made possible standardization of procedure and method so that control of these diseases in the States more advanced in public health work has become a matter of routine. Maternity and child hygiene and other newer and less developed activities have assumed greater importance and urgency with most administrators, although the control of communicable diseases is far from satisfactory and still a major problem in all departments.

Twenty-five States have well organized divisions with one or more full-time epidemiologists employed. In 12 States there is no special activity other than such part of his time as the State health officer can give. Iowa was in the latter class until this year, when a full-time epidemiologist was employed.

A department properly organized, with a proper sense of proportion and a reasonable amount of total appropriation, would probably allot not more than 10 per cent of this total to communicable-disease control. Before the development of child and maternity hygiene and county full-time health departments, there was a tendency to overemphasize communicable diseases. A keener sense of values now prevails and larger sums are now allotted to maternity and child hygiene, county health organization, and other activities which promise greater dividends in health promotion and disease prevention.

In a small, growing department, venereal diseases and tuberculosis are best handled in the communicable-disease division. Even in the larger, more highly developed States, the trend is toward reducing these activities from division rank to sections in the communicable-disease division. In Iowa these activities, tuberculosis and venereal diseases, can be handled effectively by one full-time man, either the director of the division of communicable diseases or an epidemiologist subordinate to him.

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DIVISION OF LABORATORIES

The laboratory situation is somewhat complicated because the laboratories are housed in the college of medicine at Iowa City and appropriations for their maintenance are made direct to the university.

They consist of three units, each well equipped and with adequate trained personnel. To duplicate these three units, bacteriological, serological, and water-sewage laboratories would be folly at this time. The personnel alone would cost over $25,000 per year, supplies and equipment $6,000 more, so that over $30,000 would be necessary for running expenses, without considering the cost of rented quarters and installation of equipment similar to that which now exists at the university.

A schedule of salaries and current expenses to do the work of the department now done by the university would be as follows:

Director	$5,000
1 chief bacteriologist	2,700
1 assistant bacteriologist	1,800
1 assistant serologist	1,320
1 media technician	1,620
1 technician bacteriologist	1,200
2 technicians at $960	1,920
2 water analysts	3,280
3 attendants	2,880
3 stenographers and clerks	3,000
Total salaries	24,720
Supplies and equipment	6,000
Total	30,720

To carry this work the university receives an appropriation of $14,550 for the bacteriological laboratory and $17,250 for hygiene and preventive medicine. It uses all of the bacteriological laboratory appropriation and a considerable part of the hygiene and preventive medicine appropriation to perform this work. A fee of 50 cents for each Wassermann examination enables them to avoid a deficit. Fees are also charged for water examinations, but these go directly into the State treasury. This arrangement should be continued until proper quarters to house the entire department of health are available in the proposed new State office building. It should be understood that this is a temporary arrangement, that these laboratories are an integral part of the department of health, and that they should be transferred to the department of health when that department is ready for them.

This arrangement should be continued temporarily for reasons of economy and expediency. There are certain disadvantages which

can be partially obviated. The professor of preventive medicine and hygiene of the college of medicine should be appointed, with the consent of the university, as director of the laboratory division of the State department of health. He would then be an official of the department and could ensure prompt service and reports to the department. A part of his salary, at least one-half, should be paid by the department of health as soon as funds are available.

The system of collecting fees is bad in principle and does not work well in practice. As soon as additional funds are available, all fees should be abolished and only free service rendered.

DIVISION OF PUBLIC-HEALTH ENGINEERING

This division is now well organized and is doing creditable work as a smooth-running unit. Its budget now is $22,500. The director and his first assistant are underpaid. A large amount of work is done under the State stream pollution laws. It would be wise policy to separate to some extent the stream-pollution work, which directly affects public health, from that which is done to protect fish life, or for esthetic reasons, and the energies of the division should first be concentrated upon its primary objective, the prevention of disease. It is good policy and saves money for the State to have the engineers do work for other departments of the State government. It avoids the cost of setting up duplicating machinery; but this work must be secondary to the primary disease-prevention function and should be financed from other funds than those appropriated for public health.

It would seem advisable to have a stream-pollution board created by act of legislature, consisting of the commissioner of health, the conservation of fish and game commissioner, and other officials directly interested in phases of stream pollution other than health. This board could apply the law in such cases, leaving executive action in cases affecting health in the hands of the commissioner of health. Such a board could also secure the financing, from funds other than those of the health department, of projects not affecting the public health.

In so far as possible, milk-control work should be initiated and when funds are available, a system of inspection of pasteurizing plants put in effect. Milk production activities are now exercised by the dairy and food division, department of agriculture. The supervision of milk production on the farm belongs to the department of agriculture; but in marketing milk to the consumer, the disease menace is the concern of the health authorities. Milk epidemics have occurred and in some instances from milk alleged to have been pasteurized.

In the correction of faulty design of plans or careless operation, the engineering division has a useful function.

DIVISION OF CHILD HYGIENE

The greatest possibilities for prevention of disease and the promotion and conservation of health lie in the division of child hygiene. This division should be the most important division in any health department. Forty-two States have child hygiene divisions in their health departments. Iowa, with five other States, has no child hygiene division in the health department. Because of this lack, Federal funds under the Sheppard-Towner Act were matched with funds of the University of Iowa. The work done by the university medical school was largely educational and covered maternity and infancy only. Federal aid has been discontinued and a new start must be made by creating a division of child hygiene in the department of health.

In order to avoid too many divisions, public health nursing, as in many other States, should be a section in the child hygiene division. There are over 200 public health nurses in Iowa. Their supervision by a central authority is essential to obtain the best uniform practice. The department of health has been unable to furnish this leadership and supervision. The Iowa Tuberculosis Association has been doing this work for the department and has even loaned a very competent nurse part time to the department to exercise this supervision. This supervision is an official function and can be exercised by any unofficial body only temporarily. A competent nurse should be placed on full-time duty in the child hygiene division of the health department to act as an assistant director of child hygiene and State supervisor of public health nurses.

DIVISION OF COUNTY HEALTH WORK

With the responsibility for the health of the State as a whole, it becomes a matter of vital importance to the State health department as to what type of organization exists and what shall be the local unit of organization. In the New England States the local unit is the town or township. This unit of government was a necessity in the days of bad roads and difficult communication. Where every township has a board of health, it means that these boards are merely nominal and function only where State personnel is in almost daily contact with them. In small States with good roads a system of State district health officers with liberal use of other State personnel makes the best of a bad situation for public health resultant from using the township as a unit.

The county is the logical unit of government in most States of any size, and the trend toward organization of county health boards with full-time health officers is very decided. The county health board is almost as bad as the township board if the county health officer is not a full-time official.

Experience has proved that the best type of organization in a State such as Iowa is to organize and develop county health departments with a full-time county health officer in charge. In 1915 there were only a dozen county health departments organized on such a basis, while to-day there are over 500 full-time county health officers operating.

It is much better to develop full-time county units even if the response is slow, than to build up a large State machine which would destroy local initiative for the sake of gaining a temporary advantage. Except in the New England States and in Illinois, Wisconsin, and one or two others the county is the only unit functioning on a statewide basis that has the power to levy and collect taxes and to make expenditures for public health.

The permissive county health law passed by the Iowa Legislature in 1929 now makes possible the organization of Iowa county health departments with a full-time county health officer in charge. This makes it necessary for the State department of health to have a division of county health work. No additional funds for health work can be secured before 1931, but an officer of the United States Public Health Service has been detailed for one year to assist the State in organizing full-time county health units. The greatest progress in Iowa's health history will be made in the next five years because of the possibilities of county health organization provided the legislature votes a modest sum for county health work.

PROPOSED HEALTH DEPARTMENT BUDGET FOR THE NEXT LEGISLATURE

ADMINISTRATION DIVISION

Commissioner	$5,000
Chief clerk	2,400
Secretary	1,500
Stenographer	1,200
Bookkeeper	1,200
Janitor clerk	1,200
Travel expense, general	3,000
Registrar of examinations	2,400
Stenographer	1,200
2 clerks, part-time	800
	21,100

VITAL STATISTICS DIVISION

Assistant registrar	$2,400
Stenographer	1,200
4 clerks, at $1,200	4,800
	8,400

LABORATORY DIVISION

Director, part salary	$3,500
	3,500

(All other salaries paid by the university.)

COMMUNICABLE DISEASE DIVISION

Director	$4,500
Epidemiologist	4,000
Morbidity clerk	1,500
1 stenographer	1,200
1 biologics clerk	1,200
1 janitor clerk	1,200
Travel epidemiologist	1,800
Tuberculosis	4,000
Contingent fund	4,000
Biologics	6,000
	29,400

PUBLIC-HEALTH ENGINEERING DIVISION

Chief engineer	$4,500
1 assistant engineer	3,000
1 assistant engineer	2,000
1 junior engineer	1,800
1 chemist	2,400
1 stenographer	1,200
2 part-time inspectors	900
Travel	6,000
Laboratory equipment	500
Motor transport	600
	22,900

CHILD HYGIENE DIVISION

Director	$4,500
Assistant director, supervisor of nurses	3,600
2 public-health nurses	4,800
1 stenographer	1,500
Travel	6,000
	19,800

COUNTY HEALTH WORK DIVISION

Director	$4,500
Assistant director	3,600
2 public-health nurses	4,800
1 stenographer	1,500
1 clerk	$1,200
Travel	6,000
	21,600

SUMMARY

Division of administration	$21,100
Division of vital statistics	8,400
Division of laboratories	3,500
Division of communicable diseases	29,400
Division of public health engineering	22,900
Division of child hygiene	19,800
Division county health work	21,600
Total budget	126,700

SUMMARY AND CONCLUSIONS

Briefly, the chief recommendations are four—two in Section I and two in Section II. There are many minor changes suggested, and matters of detail have purposely been omitted; these will be cared for automatically by establishing the four fundamental recommendations in Section I.

Section I—Outside agencies.—1. Formal declaration of policy by the State medical society accepting the following problem as their collective obligation and pledging themselves to bring about the desired activity of county medical societies as rapidly and as thoroughly as possible.

Problem: How can adequate medical, surgical and preventive advice and treatment be made available, within easy reach of all citizens, at a cost within their ability to pay?

2. The appointment of a special public health advisory council by the governor for the purpose of coordinating all public health activities in the State in one comprehensive public health plan.

Section II—Organization of the department.—1. The establishment of a division of child hygiene in the State department of health.

2. The establishment of a division of county health work in the State department of health.

The two chief recommendations following Section I will afford the sound foundation for a comprehensive joint plan, and the two recommendations following Section II will furnish the State department of health with the necessary machinery for carrying out such a plan in detail.

It has been the writer's guiding principle not to disturb activities already developed, by transfer to other departments, but to accept these developments as assets, leaving them in situ and devising means for their utilization by the creation of a special public health advisory council. This is consistent with the statement, made earlier, that it matters little by whom the work is done. The important thing is to have it well done by some agency. One of the common defects of State health departments is a lack of contact between the center

(State health department) and the periphery (local health units). This can be remedied in two ways:

1. By building up a big State machine, with liberal travel allowance to maintain frequent contact; and
2. By developing local units in strategic points and ultimately in every county which will maintain constant touch with the central body, the State department of health.

For reasons already explained, the first method, so far as Iowa is concerned, would be a great mistake. It would kill local initiative the very thing we must encourage and develop if we hope for permanent success.

The second method, development of full-time county health departments, is the only one that should be considered. There are many counties which are ready and anxious to begin such organization. I should not be surprised if seven or eight counties were so organized within a year. With such a beginning, showing examples of method and cost, other counties will follow rapidly, provided the organized medical profession justifies the faith reposed in them by energetically attacking their problem and actively participating in county health organization.

EXPERIMENTAL STUDIES OF WATER PURIFICATION

IV. Observations on the Effects of Certain Modifications in Coagulation-Sedimentation on the Bacterial Efficiency of Preliminary Water Treatment in Connection with Rapid Sand Filtration

By H. W. STREETER, *Sanitary Engineer, United States Public Health Service*

B. OBSERVED EFFECT OF CERTAIN MODIFICATIONS IN THE CONDITIONS OF COAGULATION

The first section of this report [1] dealt with the results of a series of observations, made at the experimental water purification plant of the Public Health Service at Cincinnati, on the effects of the bacterial efficiency of coagulation-sedimentation produced by variations in the nominal period of sedimentation ranging from 3 to 12 hours. In the second section of the paper, here presented, it is proposed to describe some observations, made at the same experimental plant, of the effects on bacterial efficiency resulting from certain modifications in the conditions surrounding the coagulation process as ordinarily practiced in connection with rapid sand filtration. These observations will be discussed under the following three headings:

(1) The relative bacterial efficiencies of single-stage and double-stage coagulation.

[1] See Public Health Reports, vol. 45, No. 27, July 4, 1930, pp. 1521-1536.

(2) Relative bacterial efficiencies observed coincidently with variations in the pH of the coagulation reaction.

(3) Relative bacterial efficiencies observed with varying amounts of coagulant added to the raw water.

RELATIVE BACTERIAL EFFICIENCIES OF SINGLE-STAGE AND DOUBLE-STAGE COAGULATION

In the purification of highly turbid river waters such as are found in the great Mississippi River Basin, the advantages of double-stage preliminary treatment of such waters prior to their filtration have been recognized for many years. As originally developed in the design of the Louisville and Cincinnati filtration plants, this kind of treatment consisted of a primary stage of plain sedimentation, in large basins providing two or three days of retention, followed by a secondary stage of coagulation-sedimentation in smaller basins of a few hours' capacity. The primary stage was intended mainly to serve as a means for removing the coarser suspended matter more readily capable of subsidence, thereby reducing the burden imposed on the coagulation process and incidentally effecting economies in the amounts of coagulants required.

More recently, at a number of plants originally equipped with primary plain sedimentation basins, coagulation has been added to this primary stage of treatment, thus providing two separate stages of coagulation-sedimentation in series with each other. The purpose of this modification has been mainly that of increasing the bacterial efficiency of filtration plants treating highly polluted raw waters, such as are found in some zones of the Ohio River and, secondarily, of aiding in the clarification of such waters during periods of high turbidity.

In order to observe simultaneously the relative efficiencies of single-stage and double-stage coagulation, as applied to the same raw water, and, in addition, to compare the results obtained from the single and double stage treatment under approximately parallel conditions with respect to sedimentation period and amount of coagulant added, a series of experiments, covering a period aggregating about eight weeks, was undertaken in the autumn of 1926.

In these experiments the same basin arrangement was used as in the Series A observations described in the preceding section of this report (see Table No. 1), the first stage of sedimentation having a nominal period of 3 hours and the second one of 6 hours, the total period for water passing through both stages being 9 hours. In all these tests approximately two-thirds of the total amount of coagulant added to the water was introduced prior to the first stage, and the remaining one-third was added between the first and second stages,

this procedure being in line with current practice in double-stage coagulation.

The averages of the results of the experiments, divided, first, into two series, "A" and "B," according to the total amounts of coagulant added to the water, and further subdivided into three groups according to the numbers of raw-water bacteria occurring on different days, are given in Tables 4 and 5, the former being based on the 24-hour 37° C. agar counts and the latter on the *B. coli* index data. The

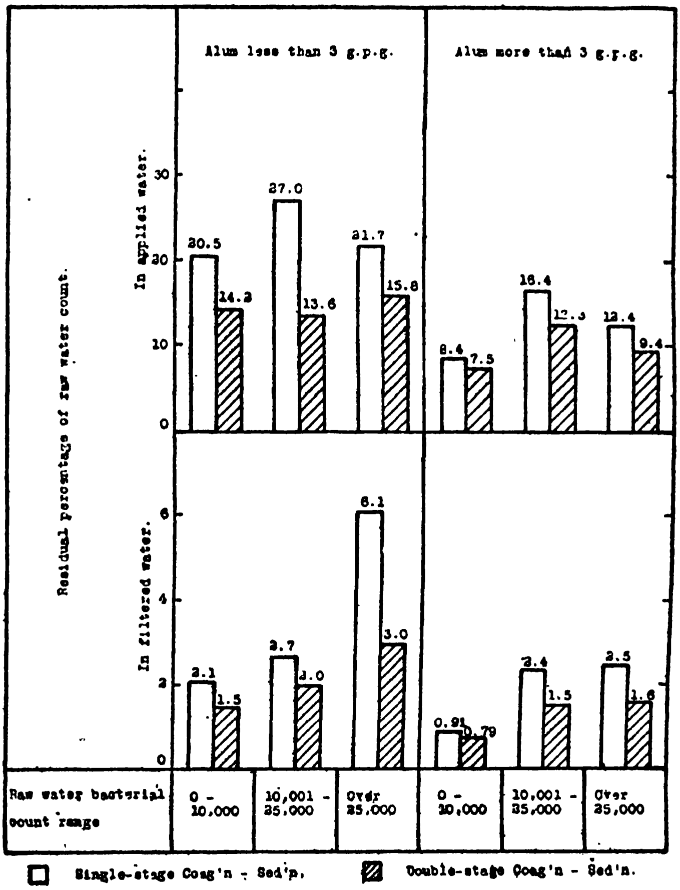

FIGURE 7.—Comparative residual percentages of raw-water bacterial counts (24 hours, 37° C.) observed in applied and filtered effluents, with single and double stage coagulation-sedimentation, respectively, corresponding to raw-water counts falling within specified ranges. (Plot of data given in Table 4)

comparative residual percentages of bacteria observed in the "applied" and "filtered" waters with single and double stage treatment, respectively, as given in these two tables, are illustrated graphically in Figures 7 and 8.

On referring to these tables and charts, it will be noted that, with two exceptions in the *B. coli* series, the indicated efficiency of removal, both of plate-growing bacteria and of *B. coli*, was consistently greater

in the effluent of the second stage of treatment than in that of the first stage. This result would be expected, in view of the longer period of sedimentation to which water passing through the two stages was

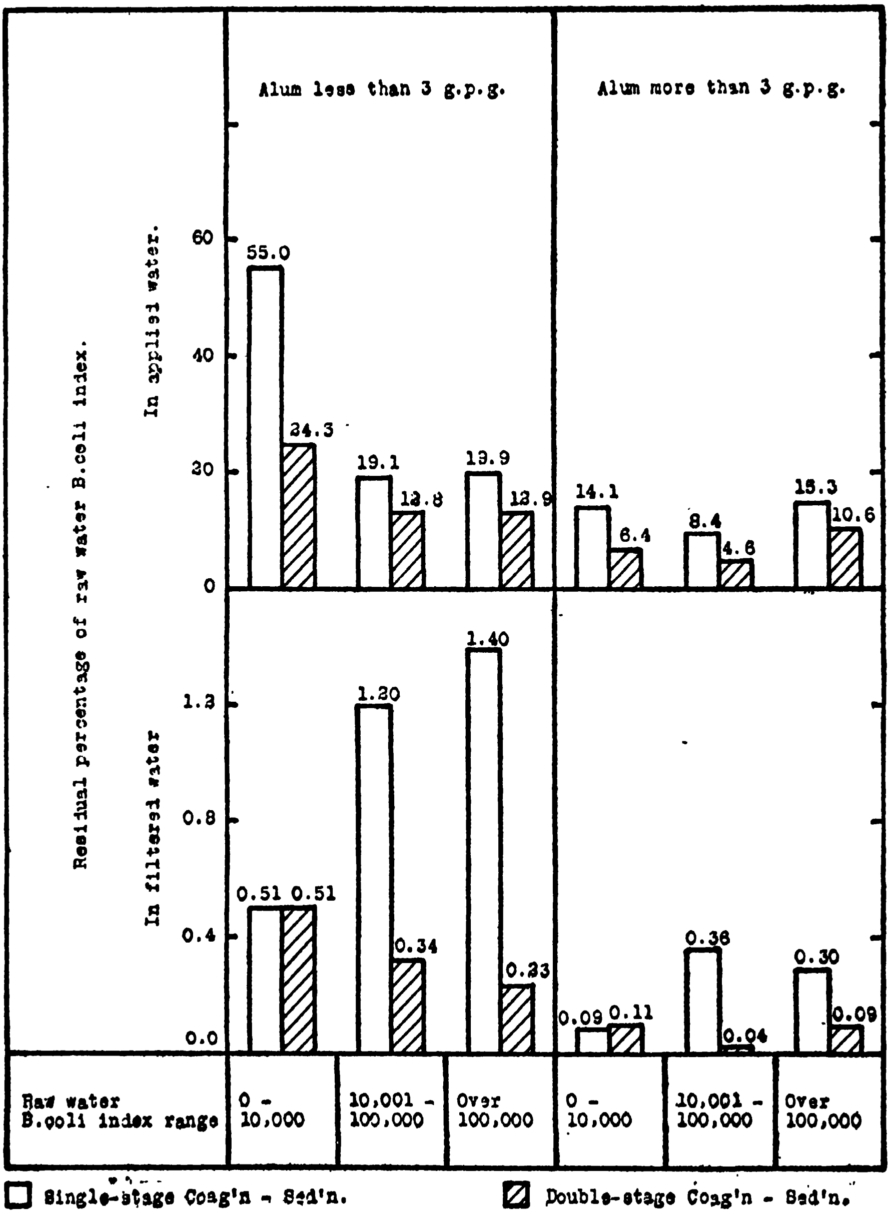

FIGURE 8.—Comparative residual percentages of raw-water *B. coli* observed in applied and filtered effluents, with single and double stage coagulation-sedimentation, respectively, corresponding to numbers or raw-water *B. coli* falling within specified ranges. (Plot of data given in Table 5)

subjected, together with the fact that before entering the second stage, it received an additional quantity of coagulant, amounting to about 50 per cent of that introduced initially.

TABLE 4.—*Comparative average bacterial counts, 24 hours, 37° C., in applied and filtered effluents, with single and double stage coagulation-sedimentation, respectively, corresponding to raw-water counts falling within specified ranges*

Raw-water count range	Stages of coagulation[1]	Alum, g. p. g.	Turbidity			Bacterial count, 24 hours, 37° C.				
			Raw, p. p. m.	Applied		Per c. c.			Per cent of raw	
				P. p. m.	Per cent of raw	Raw	Applied	Filtered	Applied	Filtered
A. ALUM LESS THAN 3 G. P. G.										
0–10,000	S	2.1	190	15.0	7.9	7,000	1,450	150	20.5	2.1
	D	2.1	190	5.0	2.6	7,000	1,000	104	14.2	1.5
10,001–25,000	S	2.2	212	41.0	19.3	15,000	4,210	419	27.0	2.7
	D	2.2	212	16.0	7.5	15,000	2,120	316	13.6	2.0
Over 25,000	S	2.7	348	48.0	13.8	66,300	14,400	4,030	21.7	6.1
	D	2.7	348	19.0	5.5	66,300	10,500	1,990	15.8	3.0
B. ALUM GREATER THAN 3 G. P. G.										
0–10,000	S	3.8	331	8.0	2.4	7,340	616	67	8.4	0.91
	D	3.8	331	3.6	1.1	7,340	550	58	7.5	.79
10,001–25,000	S	3.7	270	7.0	2.6	13,900	2,280	335	16.4	2.4
	D	3.7	270	4.3	1.6	13,900	1,710	214	12.3	1.5
Over 25,000	S	4.0	226	9.0	4.0	48,400	6,020	1,220	12.4	2.5
	D	4.0	226	4.3	1.9	48,400	4,540	760	9.4	1.6

[1] S=Single-stage coagulation-sedimentation; D=double-stage coagulation-sedimentation.

TABLE 5.—*Comparative average B. coli indices in applied and filtered effluents and single and double coagulation-sedimentation, respectively, corresponding to raw-water indices falling within specified ranges*

Raw-water index range	Stages of coagulation (*)	Alum, g. p. g.	Turbidity			B. coli index				
			Raw, p. p. m.	Applied		Per 100 c. c.			Per cent of raw	
				P. p. m.	Per cent of raw	Raw	Applied	Filtered	Applied	Filtered
A. ALUM LESS THAN 3 G. P. G.										
0–10,000	S	2.1	173	23.0	13.3	8,640	4,750	44	55.0	0.51
	D	2.1	173	6.0	3.5	8,640	2,120	44	24.5	.51
10,001–100,000	S	2.2	242	38.0	15.7	38,500	7,360	460	19.1	1.2
	D	2.2	242	15.0	6.2	38,500	4,940	132	12.8	.34
Over 100,000	S	2.6	331	42.0	12.7	1,880,000	374,000	26,400	19.9	1.4
	D	2.6	331	17.0	5.1	1,880,000	242,000	4,300	12.9	.23
B. ALUM GREATER THAN 3 G. P. G.										
0–10,000	S	3.6	287	9.0	3.1	8,650	1,220	7.6	14.1	0.09
	D	3.6	287	4.0	1.4	8,650	550	9.6	6.4	.11
10,001–100,000	S	3.8	337	6.5	1.9	42,100	3,540	150.0	8.4	.36
	D	3.8	337	3.7	1.1	42,100	1,930	16.0	4.6	.04
Over 100,000	S	4.0	226	8.7	3.8	336,000	51,400	1,020.0	15.3	.30
	D	4.0	226	4.3	1.9	336,000	35,600	310.0	10.6	.09

[1] S=Single-stage coagulation-sedimentation; D=double-stage coagulation-sedimentation.

In the foregoing connection, evidence as to whether administration of the coagulant on a "split feed" basis, as in the double-stage treatment, yielded higher bacterial efficiencies than did the addition of the total amount prior to the first stage, is afforded by a comparison of the figures given in Tables 4 and 5, with a coagulant dosage less than 3 grains per gallon, with corresponding results given in Tables 1 and 2, respectively, as derived from observations made with the same period of sedimentation (nine hours) and with approximately the same average numbers of bacteria in the raw water. Such a comparison is permissible, as all the conditions, including the average amounts of coagulant added, were approximately the same in the two series of observations, with the single exception of the method of applying the coagulant. In the series given in Tables 1 and 2, all the coagulant was added prior to the first stage, whereas in that given in Tables 4 and 5 it was divided as above described.

The results of such a comparison, which are given in Table 6, indicate that the divergence between the bacterial efficiencies obtained with the two different methods of adding the coagulant was so small as to show no well-marked gain in efficiency resulting from the use of the split-feed method of coagulation, a slight advantage in favor of the single-feed method being evidenced, in fact, by the preponderance of lower bacterial residuals observed in this series.

TABLE 6.—*Comparison of residual percentages of raw-water turbidity and bacteria observed in the applied and filtered effluents, after single-stage and double-stage coagulation-sedimentation, respectively, but with the same total period of sedimentation (nine hours) in each case, and with approximately the same average numbers of raw-water bacteria*

[Comparison of figures given in Tables 1, 2, 4, and 5]

PLATE COUNTS (24 HOURS, 37° C.)

Stages of coagulation	Average raw-water count	Per cent of raw water		
		Turbidity in applied	Bacterial count in—	
			Applied	Filtered
Single	7,030	2.0	13.4	2.0
Double	7,060	2.6	14.2	1.5
Single	12,900	5.9	22.0	1.9
Double	15,600	7.5	13.6	2.0
Single	65,800	4.4	11.0	2.4
Double	66,300	5.5	15.8	3.0

B. COLI INDEX

Stages of coagulation	Average raw-water count	Turbidity in applied	Applied	Filtered
Single	8,520	2.6	20.2	0.30
Double	8,640	3.5	24.5	.51
Single	33,900	4.2	15.3	.26
Double	38,500	6.2	12.8	.34
Single	775,000	4.2	12.7	.31
Double	1,880,000	5.1	12.9	.23

The foregoing observations would appear to signify that, in the case at hand, the greater bacterial efficiency resulting from double-stage coagulation-sedimentation was due more largely to the longer sedimentation period and to the larger total amount of coagulant used than to the division of the coagulation process into two separate stages. The slight superiority shown by single-stage sedimentation, when preceded by the addition of approximately equal amounts of coagulant and carried over the same nominal period of time, suggests, in fact, that the increased time during which the water treated was subjected to the influence of the entire mass of coagulant added to it represents a small advantage of this method over double-stage treatment, all other conditions being the same. Although this conclusion may seem at variance with that which might appear to follow from recent experience with double-stage coagulation at a number of full-scale filtration plants along the Ohio River, where a marked improvement in over-all bacterial efficiency has resulted from adoption of the double-stage method of treatment, the two conclusions may be reconciled to a large extent by noting that, in the instances cited, the addition of a primary stage of coagulation has been accompanied by the introduction of a longer period during which the water treated has been subject to the action of subsidence under the influence of a coagulant. Under these circumstances, an improvement in efficiency such as that observed, from a comparison of the relative performance of a plant before and after double-stage coagulation was instituted, would be expected, in view of the results of the foregoing experiments.

RELATIVE BACTERIAL EFFICIENCIES WITH VARIATIONS IN THE $_{p}$H OF THE COAGULATION REACTION

In the recent literature of water purification increasing recognition has been given to the importance of hydrogen ion concentration as a factor in the speed and effectiveness with which the coagulation of water is accomplished. In this connection the studies of Theriault and Clark,[2] Miller,[3] Hatfield,[4] Baylis,[5] Wagner and Enslow,[6] Catlett,[7] and others, have been of fundamental value in defining the optimum zones of pH [8] within which precipitation occurs in water treatment and in pointing out some of the physical and chemical conditions modifying the phenomenon.

As regards coagulation with salts of aluminum, which are most widely used in water purification, Hildebrand, Blum, and other investi-

[2] Pub. Health Rep., vol. 38, p. 181.
[3] Pub. Health Rep., vol. 38, p. 1895.
[4] Jour. Ind. & Eng. Chem., vol. 14, p. 1038.
[5] Jour. Am. W. W. Assoc., vol. 10, p. 365 (May, 1923).
[6] Jour. Am. W. W. Assoc., vol. 9, p. 373 (May, 1922).
[7] Jour. Am. W. W. Assoc., vol. 11, p. 887 (July, 1924).
[8] It is customary to express the hydrogen ion concentration in terms of the reciprocal of the logarithm of such concentration: thus,

$$pH = \log \frac{1}{(H^{+})}$$

gators have shown that aluminum hydroxide is precipitated to some extent at pH 4.0 and most completely precipitated at pH 6.5 to 7.5, being completely dissolved at pH 10.0 or 11.0.[9]

Theriault and Clark, working with water of low and varying buffer strengths, found that the optimum zone for alum coagulation falls between pH 5.0 and 6.0, centering around 5.5, and that the width of this zone increases with the buffer strength of the water treated. Catlett confirmed this finding in a study of the relatively soft waters of North Carolina. Miller showed that the pH zone in which aluminum is precipitated most completely is dependent on the acid ions present and that a definite relation exists between the amount of anion per gram of "floc" and the anion concentration of the solution in which precipitation occurs.[10]

From the work of the foregoing investigators, Ellms [11] concludes that the successful coagulation of water with alum requires (1) a certain minimum quantity of aluminum ions, (2) an anion of high coagulating power, and (3) such an adjustment of the concentration of hydrogen ions as will produce the optimum conditions for floc formation. He also notes that "flocs" obtained from the precipitation of iron salts do not dissolve at higher pH values; hence less careful adjustment of the hydrogen ion concentration is required in this case.

During part of the year 1926 a favorable opportunity existed, in connection with the experiments recorded in this paper, for observing the comparative bacterial efficiencies of coagulation-sedimentation under varying conditions of pH, with all other conditions held approximately constant except the bacterial content of the raw water, which was not subject to control within narrow limits. In addition to routine observations covering the middle ranges of pH, such as ordinarily occurred in the operation of the experimental plant, two series of controlled tests were made, in which the pH of the coagulation reaction was adjusted to embrace values ranging from 5.4 to 7.3. In one series, divided into several "runs" each covering a period of a week, the pH was increased daily by an amount sufficient to carry the observations for a given week over a predetermined range. In the other, occupying several weeks, the pH was held constant throughout each week and changed from week to week.

The results obtained from the former of the two series were not satisfactorily clear-cut, owing to lag effects produced by the daily changes made in the pH. When combined with the results of the

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[9] Ellms, J. W.: Water Purification, 2d edition, p. 427.

[10] Buswell, A. M.: Chemistry of Water and Sewage Treatment. Am. Chem. Soc. Monograph Series, pp. 166–168.

[11] Ellms, J. W., loc. cit., p. 430.

other series, and with those of the longer period of routine observations, they served a useful purpose, however, in supplementing tests made at the more extreme ranges of pH. For analysis, all of the material obtained from the two series of experiments was combined with that of the routine observations.

The statistical treatment given the combined material consisted of classifyng the daily results, first, according to variations in pH and, second, according to variations in the bacterial content of the raw water, in order to determine the extent to which each of these two factors, considered separately, might influence the efficiency of bacterial removal. The primary classification consisted of separating the material into groups according to pH values falling into the

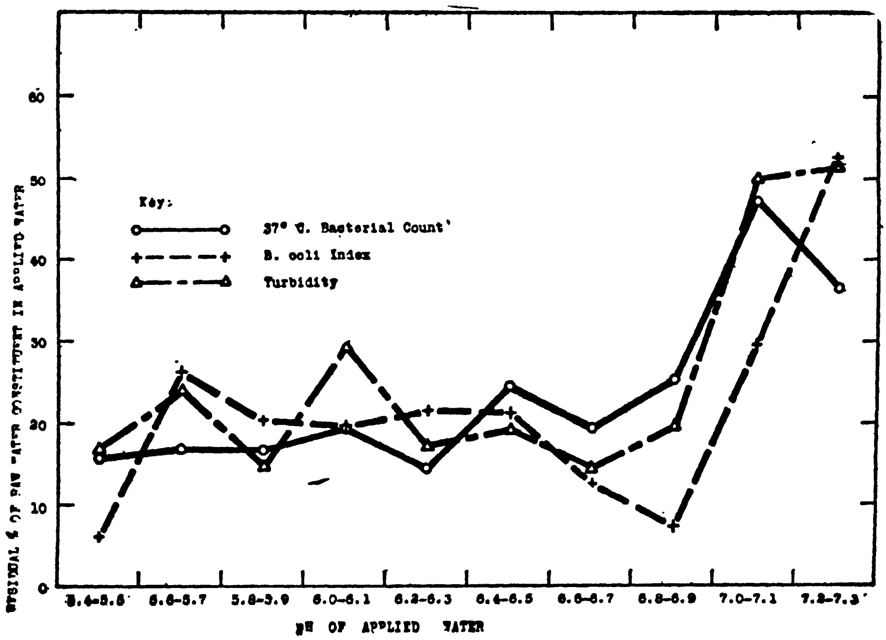

FIGURE 9.—Relation between pH of coagulation reaction and residual percentage of turbidity and bacteria in applied water

ranges, 5.4–5.5, 5.6–5.7, etc., up to a maximum range of 7.2–7.3. Each one of these groups of data was further divided into three subgroups according to raw-water bacterial counts falling within the ranges, 0–2,500, 2,500–10,000, and over 10,000. All of the results falling into each primary group and each subgroup were averaged separately and tabulated.

The results of the primary separation of the data according to pH values are given in Table 7 and illustrated graphically in Figure 9, in which the residual percentages of turbidity, 37° C. bacterial counts and *B. coli* observed in the applied water (i. e., after coagulation-sedimentation) have been plotted against the corresponding pH values of the same water. The general trends of the three

curves are very similar, indicating that changes in pH affected in approximately the same degrees the removal of turbidity and the two classes of bacteria enumerated. All three curves, with minor fluctuations, follow a fairly level trend up to the pH range 6.8–6.9, where they show a sharp upward break. It thus would appear that the efficiency of removal was not influenced markedly by variations in pH between values of 5.4 and 6.9, but fell off decidedly with pH values exceeding 6.9.

TABLE 7.—*Average residual percentages of turbidity and bacteria observed in applied water, coincidentally with pH values falling within specified ranges (April 1, 1925–March 31, 1926)*

Applied water, pH range	Number of tests	Temperature	Alum, g. p. g.	Lime, g. p. g.	Turbidity		Per cent of raw, applied	Agar, 37° C.		Per cent of raw, applied	B. coli index		Per cent of raw, applied
					Raw	Applied		Raw	Applied		Raw	Applied	
5.4–5.5	1	16.4	2.39	-------	142	24	16.9	2,430	387	15.9	4,600	280	6.1
5.6–5.7	3	12.4	2.29	0.44	157	39	24.8	3,200	541	16.9	5,500	1,440	26.2
5.8–5.9	8	18.8	2.89	-------	124	18	14.5	5,700	915	16.6	17,500	3,530	20.2
6.0–6.1	16	22.9	2.94	.87	51	15	29.4	7,740	1,500	19.4	21,800	4,870	19.6
6.2–6.3	36	15.7	2.64	.66	105	18	17.1	8,080	1,170	14.5	15,700	3,400	21.6
6.4–6.5	52	16.0	2.25	.89	110	21	19.1	5,720	1,390	24.3	23,900	5,050	21.2
6.6–6.7	47	20.8	1.77	.81	138	20	14.5	12,100	2,320	19.2	61,900	7,740	12.5
6.8–6.9	20	11.8	1.83	.77	91	18	19.8	3,370	850	25.2	34,500	2,440	7.1
7.0–7.1	5	6.9	1.82	.80	20	10	50.0	569	269	47.3	3,660	1,090	29.8
7.2–7.3	6	15.7	2.16	.65	31	16	51.7	2,000	728	36.4	2,240	1,180	52.7

A somewhat different picture is presented by the more amplified results of subclassifying the 37° C. plate count data according to raw-water bacterial counts, as shown in Table 8 and, graphically, in Figure 10. In referring to this chart, the general trend of the uppermost plot (raw-water count 0–2,500) and, to a less extent, of the middle plot (2,500–10,000) is upward from the lowest pH range, 5.4–5.5. The trend of the lowest plot (raw-water count greater than 10,000) hardly can be regarded as significant in this connection, as the observations for this group covered only a limited middle range of pH values. It also is noteworthy that the effect of bacterial density in the raw water on the efficiency of bacterial removal is shown very clearly by the relative positions of the three plots, the efficiency being consistently greater with higher bacterial densities.

Although the observations thus recorded did not cover a sufficient range of pH values to show well-defined maxima and minima with respect to removal efficiencies, they indicated quite clearly that the efficiency both of turbidity and of bacteria removal was diminished very decidedly when the pH value of the reaction approximated 7.0 or above, within the limits of the experiment, and that the efficiency of bacterial removal tended to approach a maximum at the lower ranges limited by 5.4 to 5.5. In the latter connection, it is of interest to note again the conclusion of Theriault and Clark [12] that the most effective coagulation in their experiments occurred at pH values centering around 5.5.

[12] Loc. cit.

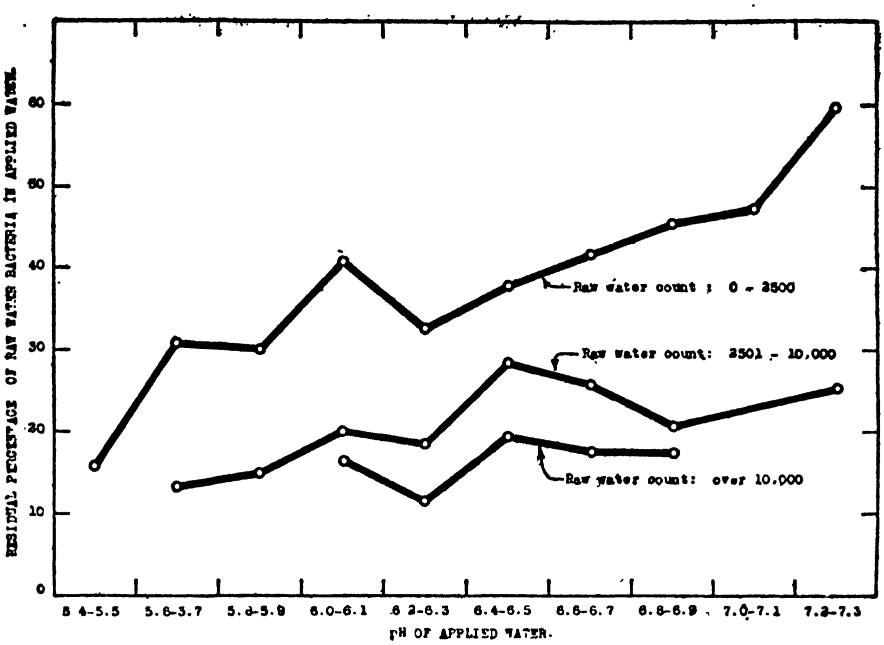

FIGURE 10.—Relation between pH of coagulation reaction and residual percentages of raw-water bacteria observed in applied water, corresponding to averages of numbers of raw-water bacteria falling within three specified ranges. (Plot of data given in Table 8)

TABLE 8.—*Data of Table 7 further classified according to raw-water bacterial counts falling within each range of pH values*

[Bacterial counts, 24 hours, 37° C.]

Applied pH range	Raw-water count range	Number of tests	Temperature	Alum, g. p. g.	Lime, g. p. g.	Turbidity			Bacterial count per c. c.			Per cent of raw	
						Raw	Applied	Residual, per cent	Raw	Applied	Filtered	Applied	Filtered
5.4-5.5	0- 2,500	1	16.4	2.39	-------	142	24	16.9	2,430	387	8	15.9	0.33
5.6-5.7	0- 2,500	1	15.3	2.04	1.03	79	48	60.8	1,690	522	62	30.9	3.7
	2,501-10,000	1	15.3	2.25	-------	228	39	17.1	5,920	774	86	13.1	1.5
5.8-5.9	0- 2,500	3	17.3	2.78	-------	137	20	14.6	1,670	502	53	30.0	3.2
	2,501-10,000	5	19.6	2.95	-------	116	16	13.8	8,120	1,210	118	14.9	1.5
6.0-6.1	0- 2,500	5	17.9	2.52	.86	73	24	32.9	1,310	536	70	40.9	5.3
	2,501-10,000	8	25.5	3.17	-------	36	10	27.8	6,150	1,230	157	20.0	2.6
	Over 10,000	3	24.2	3.02	-------	55	14	25.5	23,500	3,850	298	16.4	1.3
6.2-6.3	0- 2,500	18	12.6	2.30	.64	88	20	22.7	1,580	513	42	32.5	2.7
	2,501-10,000	9	14.0	2.60	.74	156	20	12.8	4,640	854	57	18.4	1.2
	Over 10,000	9	23.8	3.35	-------	89	13	14.6	24,500	2,810	283	11.5	1.2
6.4-6.5	0- 2,500	16	10.1	2.23	.87	88	18	20.4	1,470	556	44	37.8	3.0
	2,501-10,000	24	16.8	2.08	.96	103	22	21.4	4,720	1,340	106	28.4	2.2
	Over 10,000	12	22.3	2.60	-------	152	20	13.2	13,400	2,610	269	19.5	2.0
6.6-6.7	0- 2,500	12	11.3	1.90	.74	45	19	42.2	1,430	595	14	41.6	.98
	2,501-10,000	12	20.9	1.56	1.13	105	20	19.0	5,390	1,390	52	25.8	.96
	Over 10,000	23	25.7	1.80	-------	204	20	9.8	21,200	3,700	298	17.5	1.4
6.8-6.9	0- 2,500	13	8.6	1.82	.75	32	17	53.1	1,000	457	7.5	45.7	.75
	2,501-10,000	6	16.4	1.57	.90	234	25	10.7	4,790	992	63	20.6	1.3
	Over 10,000	1	26.5	3.42	-------	4	4	100.0	33,400	5,750	790	17.2	2.4
7.0-7.1	0- 2,500	5	6.9	1.82	.80	20	10	50.0	569	269	5.5	47.3	.97
7.2-7.3	0- 2,500	4	11.5	1.94	.67	31	18	58.0	968	577	21	59.7	2.2
	2,501-10,000	2	16.4	2.62	.57	30	12	40.0	4,070	1,030	155	25.3	3.8

RELATIVE BACTERIAL EFFICIENCIES OBSERVED WITH VARYING AMOUNTS OF COAGULANT ADDED TO RAW WATER

It has been generally recognized since the early days of water purification that within certain limits the efficiency of removal of suspended matter and bacteria by rapid sand-filtration processes is influenced very considerably by the density of floc formed by the coagulant added to the raw water prior to sedimentation and filtration. For this reason it was considered as an important part of these experiments to observe the extent to which the bacterial efficiency of the various stages of treatment was influenced, if at all, by the addition of various amounts of coagulant.

The comparative observations herein recorded were made principally during a period of three years, extending from October, 1924, to September, 1927, inclusive, both in connection with the routine operation of the experimental plant and on several special occasions, when experiments occupying short-test periods of about a week, in each case, were made with the single object of ascertaining the extent to which the bacterial efficiency of the plant was affected by variations in the coagulant density. During the years 1928 and 1929, up to the time at which the operation of the experimental plant was discontinued, a few short series of tests were made, in parallel, with different amounts of coagulant [13] added to the raw water. These latter tests were not sufficiently extensive, however, to yield results of any material value, except to confirm, in certain respects, those of the longer series made during the years 1924–1927.

In making the special observations extending over weekly test periods, the usual procedure consisted in varying the alum dosage in three stages, generally in the direction of an increase, holding the dosage constant at each stage for about one-third of the week (i. e., two days) and maintaining all other conditions of the treatment as nearly constant as practicable throughout the entire week. Although the turbidity and bacterial content of the raw river water remained fairly constant throughout each test week, its uniformity in these respects was disturbed occasionally by the effects of local rains, which sometimes caused sudden increases in both of the constituents designated. Changes of this character doubtless caused irregularities in the general trend of the results, as the efficiency of purification, and notably that of preliminary coagulation-sedimentation, is influenced very considerably by the density of turbidity and bacteria in the raw water.[14]

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[13] The coagulant used throughout these experiments was ordinary basic aluminum sulphate, such as ordinarily is designated as "filter alum." This material was purchased on standard specifications conforming to those of the American Water Works Association.

[14] See p. 1606; also Public Health Bulletin No. 172, Figure 25, p. 102, and conclusion (3), p. 227; also Reprint No. 1114 from the Public Health Reports, Oct. 1, 1926, p. 15.

TABLE 9.—*Relations between amounts of coagulant and bacterial efficiency*

[Summary of averages of six weekly experiments in 1926]

Week	Alum g. p. g.[1]	Turbidity		Bacteria per c. c.—37° C.				B. coli index per 100 c. c.				Residual per cent of raw water							
												Turbidity		Bacterial count			B. coli index		
		Raw	Applied	Raw	Applied	Filtered	Chlorinated	Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
Apr. 26–30	1.6	69	29	918	466	11	0.7	7,750	1,000	8	1.3	42.1	0	50.8	1.2	0.076	12.9	1.0	0.017
	2.2	97	22	2,030	158	19	.3	19,000	663	3.7	.0	22.7	0	7.8	.9	.015	3.5	.019	.0
	2.7	169	23	2,720	270	1.9	.4	16,700	3,020	6	.0	13.6	0	9.9	.07	.015	18.1	.036	.0
May 3–8	.5	22	15	12,000	8,680	3,140	245	6,620	5,500	168	2.3	68.2	0	72.3	26.2	2.0	83.2	2.5	.035
	.9	26	19	10,700	4,540	544	22	16,800	5,380	8	.3	73.0	0	42.4	5.1	.21	32.0	.048	.002
	1.7	39	20	2,840	623	14	1	29,100	3,140	19	1.0	51.3	0	21.9	.50	.03	10.8	.07	.003
June 14–19	.5	303	47	8,560	1,700	268	----------	37,700	6,030	480	----------	15.5	------	19.9	3.1	----------	16.0	1.3	----------
	2.6	116	8	6,870	1,180	69	----------	40,000	2,380	24	----------	6.9	------	17.2	1.0	----------	6.0	.06	----------
	3.7	75	7	13,950	1,120	91	----------	70,000	4,000	70	----------	9.3	------	8.0	.65	----------	5.7	.10	----------
June 21–25	[2] .5	403	203	203,000	129,000	15,900	----------	3,800,000	400,000	55,000	----------	49.7	------	63.6	7.8	----------	10.5	1.4	----------
	2.2	243	15	149,000	59,500	22,300	----------	1,000,000	850,000	55,000	----------	6.2	------	40.0	15.0	----------	85.0	5.5	----------
	[2] 3.3	113	12	146,000	42,000	14,900	----------	1,000,000	700,000	70,000	----------	10.6	------	28.8	10.2	----------	70.0	7.0	----------
June 28–July 3[3]	.4	28	8	51,800	32,500	7,290	----------	438,000	438,000	8,880	----------	28.6	------	62.8	14.1	----------	100.0	2.0	----------
	2.4	36	5	26,500	9,250	2,610	----------	550,000	179,000	1,000	----------	13.9	------	34.9	9.8	----------	32.5	.18	----------
	4.1	72	6	45,900	8,200	3,900	----------	700,000	40,000	7,000	----------	8.3	------	17.9	8.5	----------	5.7	1.0	----------
July 6–9	[2] .4	5	3	132,000	37,600	8,080	----------	1,000,000	775,000	10,000	----------	60.0	------	28.5	6.1	----------	77.5	1.0	----------
	[2] 2.4	5	2	84,900	32,500	982	----------	5,500,000	325,000	3,250	----------	40.0	------	38.3	1.2	----------	5.9	.06	----------
	4.4	8	4.5	64,500	27,200	2,930	----------	1,900,000	325,000	3,250	----------	56.3	------	42.2	4.5	----------	17.1	.17	----------

[1] Alum dosage maintained at each given average amount during approximately one-third of each weekly test period.
[2] Based on results for 1 day only.
[3] Repetition of test of June 21–25.

The results of six fairly typical experiments, each extending over a period of a week, are given in Table 9, in the form of averages for each 2-day period in which the amount of coagulant added to the raw water was maintained nearly constant. On comparing the residual percentages of raw-water turbidity and bacteria with the average amounts of alum, it will be noted that, with a few exceptions, probably due in some cases to disturbances such as those above noted, and in others to lag effects resulting from changes in the alum dosage, an increase in the amount of coagulant added was accompanied by an indicated gain in the efficiency of turbidity and bacterial removal, not only after coagulation-sedimentation, but also, to a somewhat less well-marked extent, after filtration.

More satisfactory evidence on these points was afforded, however, by a statistical analysis of the combined results of the routine and special observations extending over the 3-year period, October, 1924, to September, 1927. In compiling these figures the daily average results obtained during the period in question were classified successively in accordance with variations in three different factors, namely, (*a*) alum dosage, (*b*) raw-water turbidity, and (*c*) raw-water bacterial content. The method followed consisted (1) in dividing the observations into four groups according to amounts of alum added to the raw water falling within the ranges, 0–2, 2–3, 3–4, and over 4 grains per gallon; (2) in subdividing each one of these groups into three subgroups according to raw-water turbidities falling within the ranges, 0–10, 11–100, and over 100 parts per million; and (3) in further subdividing each one of the 12 groups thus obtained into another series of subgroups according to raw-water bacterial counts (24 hours, 37° C.) falling within the ranges 0–2,500, 2,501–5,000, 5,000–10,000, and over 10,000, or according to raw-water *B. coli* indices falling within the ranges, 0–5,000, 5,000–10,000, 10,000–50,000, and over 50,000. The figures thus obtained were totaled and averaged arithmetically into a series of group averages, which afforded an index of the quality of effluent produced at each stage of treatment under any given condition with respect to alum dosage, raw-water turbidity, and raw-water bacterial content, within the limiting ranges defined.

Although the observations thus classified covered a period aggregating 382 test days, the number of observations falling into the smallest of the three successive classification groups was so low in some cases as to make the trend of the data very irregular. For this reason it was considered advisable to recombine the data into two series, both classified primarily according to alum dosage. One series, then, was subclassified according to raw-water turbidity and the other according to raw-water bacterial content, or *B. coli* index, falling within the ranges above specified. From this procedure two series of group averages were obtained, one showing the effect of

varying amounts of coagulant on the quality of effluent produced from raw water of low, medium, and high turbidity, respectively, and the other the corresponding effect on the quality of effluent produced from raw water of different ranges in bacterial content.

The results of the subclassification according to raw-water turbidity have been summarized in Tables 10 and 11, the former showing the bacterial quality of effluents expressed in terms of the 37° C. plate count and the latter the corresponding quality in terms of the *B. coli* index. In Tables 12 and 13 the results of the corresponding subclassification according to raw-water bacterial content have been summarized in a similar manner. In Tables 10 and 11, sections "D," the data originally subclassified according to raw-water turbidity, have been recombined irrespective of turbidity, so as to show the relation observed between alum dosage and bacterial efficiency, regardless of raw-water turbidity or bacterial content.

TABLE 10.—*Relation between amounts of alum added to raw water and efficiency of bacterial removal, as observed within various ranges of raw-water turbidity*

[Bacterial counts, 24 hours, 37° C.]

Alum range, grains per gallon	Number of results	Average alum added, g. p. g.	Average turbidity, p. p. m.	Average bacterial count per c. c.				Per cent of raw in—		
				Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
A. RAW-WATER TURBIDITY: 0-10										
0-2	2	1.5	10	10,900	4,250	313	51.0	39.0	2.9	0.47
2-3	10	2.7	5	8,350	2,880	112	18.4	34.5	1.3	.22
3-4	6	3.3	5	12,900	2,440	232	12.7	18.9	1.8	.10
Over 4	0									
B. RAW-WATER TURBIDITY: 11-100										
0-2	76	1.5	42	10,100	3,320	321	24.0	32.9	3.2	0.24
2-3	42	2.3	48	9,840	2,750	431	39.0	28.0	4.4	.40
3-4	44	3.4	35	10,200	1,510	140	4.5	14.8	1.4	.04
Over 4	4	4.4	68	2,230	298	4	1.1	13.4	.18	.05
C. RAW-WATER TURBIDITY: OVER 100										
0-2	53	1.6	296	10,500	1,520	217	14.0	14.5	2.1	0.13
2-3	91	2.5	275	9,630	1,800	349	8.7	18.7	3.6	.09
3-4	47	3.4	239	7,830	883	52	4.5	11.3	.66	.06
Over 4	7	4.5	236	4,040	251	11	.9	6.2	.27	02
D. ALL TURBIDITIES (COMBINED)										
0-2	131	1.6	144	10,300	2,590	279	21.0	25.2	2.7	0.20
2-3	143	2.5	190	9,600	2,150	356	19.5	22.4	3.7	.20
3-4	97	3.4	132	9,230	1,260	103	5.1	13.7	1.1	.06
Over 4	11	4.4	175	3,110	268	9	1.0	8.6	.30	.03

Table 11.—*Relation between amounts of alum added to raw water and efficiency of B. coli removal, as observed within various ranges of raw-water turbidity*

A. TURBIDITY: 0–10

Alum range, grains per gallon	Number of results	Average alum added, g.p.g.	Average turbidity, p.p.m.	Average B. coli index per 100 c. c.				Per cent of raw in—		
				Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
0–2	2	1.5	10	32,500	30,300	550	2.7	93.3	1.70	0.008
2–3	10	2.7	5	43,700	13,400	19	2.3	30.7	.04	.005
3–4	6	3.3	5	122,000	11,200	174	1.1	9.2	.14	.001
Over 4	0									

B. TURBIDITY: 11–100

Alum range, grains per gallon	Number of results	Average alum added, g.p.g.	Average turbidity, p.p.m.	Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
0–2	76	1.5	42	42,500	11,700	119	3.2	27.5	0.28	0.008
2–3	42	2.3	48	31,300	8,000	92	5.3	25.6	.29	.017
3–4	44	3.4	35	39,700	5,640	90	.9	14.2	.23	.002
Over 4	4	4.4	68	24,100	2,340	16	1.0	9.7	.07	.004

C. TURBIDITY: OVER 100

Alum range, grains per gallon	Number of results	Average alum added, g.p.g.	Average turbidity, p.p.m.	Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
0–2	53	1.6	296	33,700	3,200	184	5.6	9.5	0.55	0.017
2–3	91	2.5	275	23,900	3,510	124	5.3	14.7	.52	.022
3–4	47	3.4	239	19,500	2,080	34	1.9	10.7	.17	.010
Over 4	7	4.5	236	18,300	733	41	.2	4.0	.22	.001

D. ALL TURBIDITIES (COMBINED)

Alum range, grains per gallon	Number of results	Average alum added, g.p.g.	Average turbidity, p.p.m.	Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
0–2	131	1.6	144	38,700	8,430	152	4.5	21.8	0.39	0.012
2–3	143	2.5	190	27,400	5,500	107	5.0	20.0	.39	.018
3–4	97	3.4	132	35,000	4,280	68	1.3	12.2	.19	.004
Over 4	11	4.4	175	20,400	1,320	32	.5	6.5	.16	.002

Table 12.—*Relation between amounts of alum added to raw water and efficiency of bacterial removal, as observed within various ranges of raw-water bacteria*

[Bacterial counts, 24 hours, 37° C.]

RAW-WATER BACTERIAL COUNT: 0–2,500

Alum range, grains per gallon	Number of results	Average alum added, g. p. g.	Average turbidity, p. p. m.	Average bacterial count per c. c.				Per cent of raw in—		
				Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
0–2	14	1.4	131	1,480	417	74.0	1.3	28.2	5.0	0.088
2–3	47	2.5	133	1,630	331	14.0	1.3	20.3	.86	.080
3–4	17	3.4	114	1,900	249	6.5	.9	13.1	.34	.047
Over 4	6	4.6	117	1,780	196	2.9	.8	11.0	.16	.045

RAW-WATER BACTERIAL COUNT: 2,501–5,000

Alum range, grains per gallon	Number of results	Average alum added, g. p. g.	Average turbidity, p. p. m.	Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
0–2	37	1.5	78	3,750	906	58.0	1.0	24.2	1.6	0.027
2–3	28	2.5	185	3,650	676	26.0	4.8	18.5	.71	.132
3–4	25	3.4	182	3,570	403	18.0	.8	11.3	.50	.022
Over 4	3	4.3	157	3,860	298	2.7	.8	7.7	.07	.021

RAW-WATER BACTERIAL COUNT: 5,001–10,000

Alum range, grains per gallon	Number of results	Average alum added, g. p. g.	Average turbidity, p. p. m.	Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
0–2	30	1.5	196	7,420	1,580	171.0	6.4	21.3	2.3	0.086
2–3	23	2.5	222	7,100	1,450	99.0	5.5	20.4	1.4	.077
3–4	19	3.3	138	7,530	1,090	111.0	1.6	14.5	1.5	.021
Over 4	2	4.2	375	7,440	442	39.0	1.7	5.9	.52	.023

RAW-WATER BACTERIAL COUNT: OVER 10,000

Alum range, grains per gallon	Number of results	Average alum added, g. p. g.	Average turbidity, p. p. m.	Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
0–2	50	1.6	166	19,400	4,950	477.0	26.0	25.5	2.5	0.134
2–3	45	2.4	236	22,900	5,330	626.0	24.0	23.2	2.7	.104
3–4	35	3.4	102	18,000	2,440	210.0	10.0	13.6	1.2	.056
Over 4	0									

Table 13.—*Relation between amounts of alum added to raw water and efficiency of B. coli removal, as observed within various ranges of raw-water B. coli index*

Alum range, grains per gallon	Number of results	Average alum added, g. p. g.	Average turbidity, p. p. m.	Average B. coli index per 100 c. c.				Per cent of raw in—		
				Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
RAW-WATER B. COLI INDEX: 0-5,000										
0-2	9	1.5	101	2,360	1,430	19.0	0.87	60.6	0.80	0.037
2-3	24	2.5	211	2,820	1,440	6.6	.42	51.0	.23	.015
3-4	11	3.5	241	2,720	958	32.0	.32	35.2	1.2	.012
Over 4	4	4.5	196	3,630	882	1.4	.25	24.3	.04	.007
RAW-WATER B. COLI INDEX: 5,001-10,000										
0-2	49	1.6	198	7,990	3,140	95.0	1.6	39.3	1.2	0.020
2-3	54	2.5	186	7,880	1,960	22.0	1.7	24.9	.28	.022
3-4	37	3.4	147	7,940	2,660	35.0	.38	33.5	.44	.005
Over 4	1	4.8	91	5,500	775	29.0	2.0	14.1	.53	.036
RAW-WATER B. COLI INDEX: 10,001-50,000										
0-2	40	1.5	130	34,200	10,100	165.0	2.1	29.5	0.48	0.006
2-3	36	2.4	191	31,300	8,480	110.0	1.9	27.1	.35	.006
3-4	28	3.4	96	33,100	5,730	74.0	1.8	17.3	.22	.005
Over 4	5	4.2	186	30,200	1,970	69.0	.4	6.5	.23	.001
RAW-WATER B. COLI INDEX: OVER 50,000										
0-2	33	1.6	94	98,300	15,500	173.0	7.3	15.8	0.18	0.007
2-3	29	2.4	177	79,500	10,500	284.0	14.0	13.2	.36	.018
3-4	20	3.4	95	107,000	6,880	129.0	1.5	6.4	.12	.001
Over 4	1	4.9	116	52,800	325	1.5	.5	.6	.003	.001

On referring to Tables 10 and 11 it will be noted that with approximately equivalent average raw-water turbidities the residual percentages of bacteria observed in the applied water, which afford an index of the bacterial efficiency of coagulation-sedimentation, show a fairly regular decrease coincidently with the addition of greater amounts of alum. The extent of decrease in each case is shown graphically in Figure 11, which has been plotted from the applied water residuals in Tables 10 and 11. In Figure 12, plotted from the residuals given in Tables 12 and 13, a similarly regular gain in the bacterial efficiency of coagulation-sedimentation is shown to have occurred coincidently with increases in alum dosage made under approximately equivalent conditions of raw-water bacterial content.

A comparison of the corresponding bacterial residuals observed in the filtered and chlorinated effluents, which are given in the four tables but not illustrated graphically, indicates that the general effect of increasing densities of coagulant on the bacterial efficiency was discernible after filtration and, to a less extent, even after final chlorination of the filtered effluent. It thus appears that a measurable improvement in efficiency was obtainable throughout the entire treatment process by increasing the amount of alum up to densities

ranging as high as 4 to 5 grains per gallon, and the general trend of the residuals would suggest that fairly substantial gains in efficiency might be expected with even higher amounts of coagulant than the upper range indicated. This tendency is illustrated by the distinctly

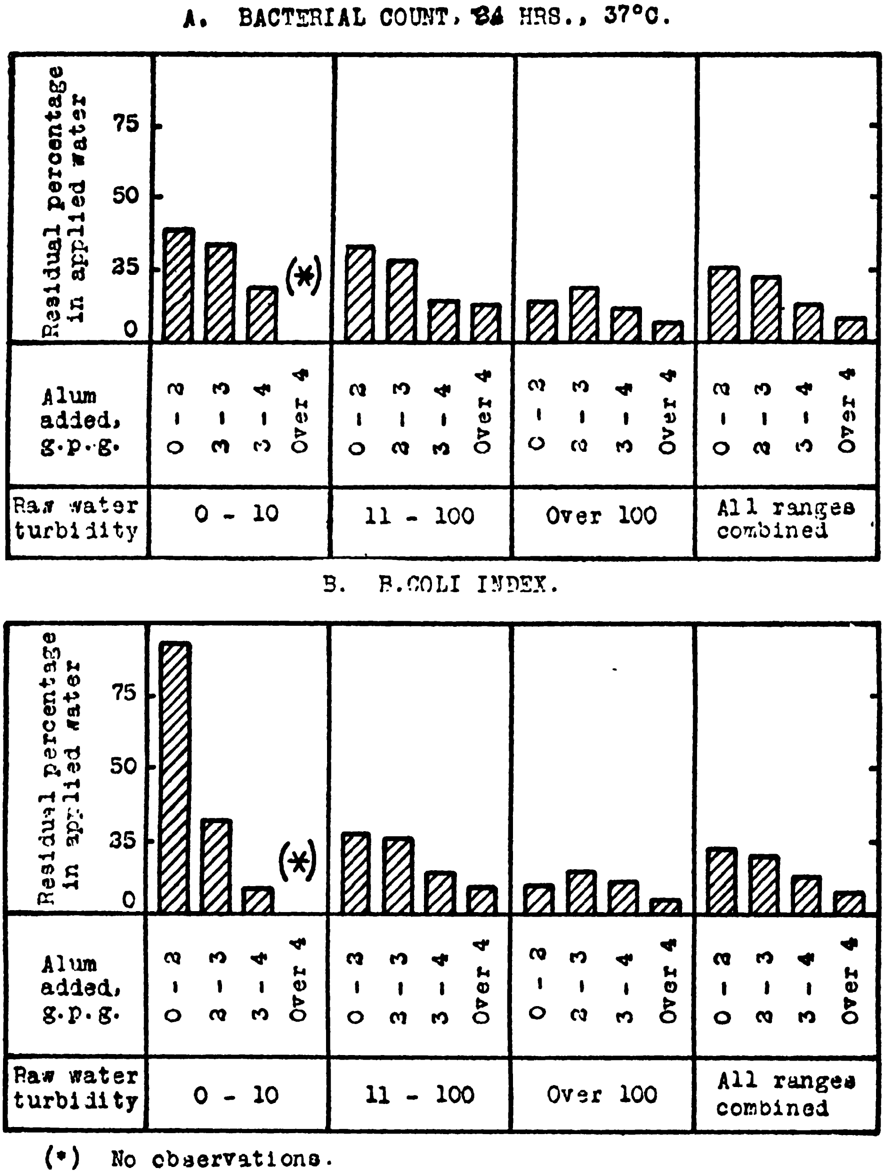


FIGURE 11.—Relation between amounts of alum added to raw water and bacterial efficiency of coagulation-sedimentation, as observed within various ranges of raw-water turbidity. (Plot of data in Tables 10 and 11)

downward trend of the semilogarithmic plots of the combined applied water residuals shown in Figure 13, which are based on the figures given in sections "D" of Tables 10 and 11. In this chart the slope of each plot, which is a measure of the proportionate decrease in the

residual percentage of bacteria, remains practically the same with an increase in average alum dosage from 3.4 to 4.4 g. p. g. as with an increase from 2.5 to 3.4 g. p. g., in the next lower range.

For any given range of coagulant density, such as, for example, from 2 to 3, or 3 to 4, grains per gallon, the variations observed in

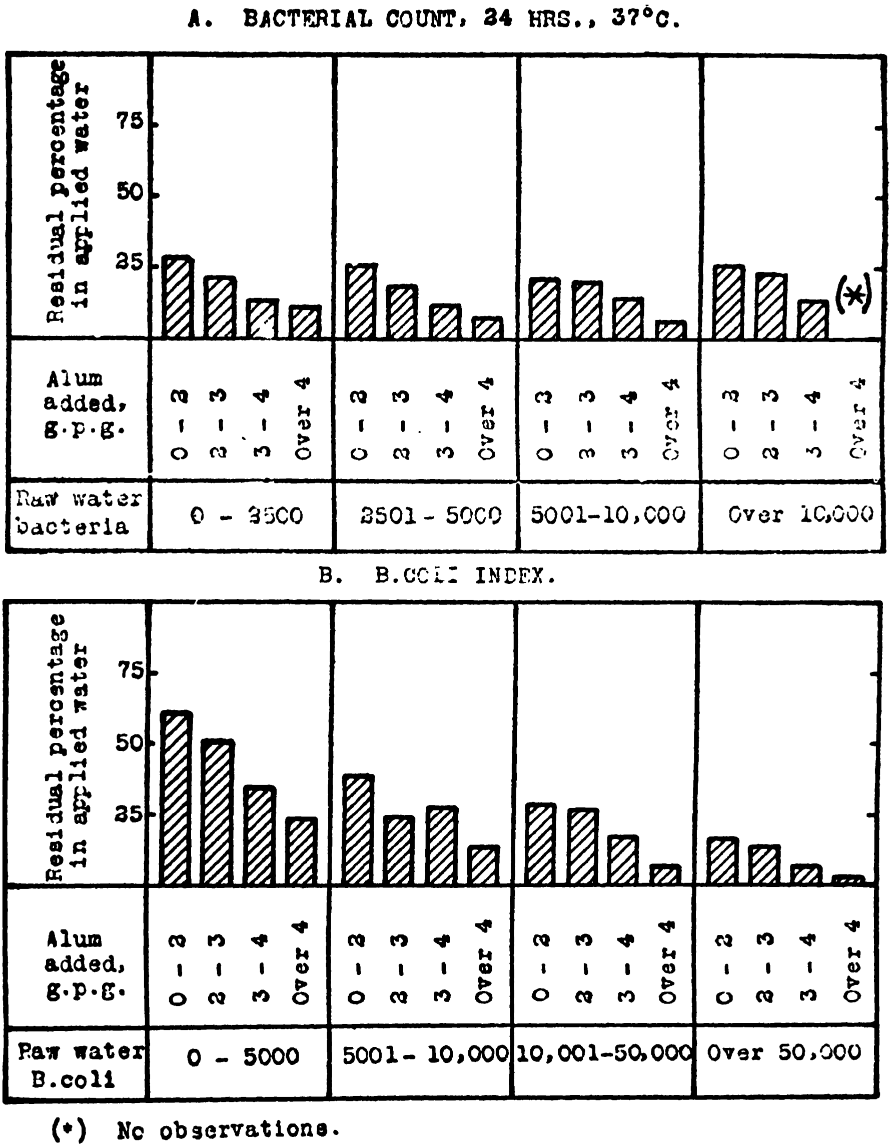


FIGURE 12.—Relation between amounts of alum added to raw water and bacterial efficiency of coagulation-sedimentation, as observed within various ranges of raw-water bacterial content. (Plot of data in Tables 12 and 13)

the bacterial efficiency of coagulation-sedimentation followed about the same general trend as previously noted [15] in connection with the primary series of experiments made during the years 1924 and 1925.

[15] See Reprint No. 1114 from the Public Health Reports, Oct. 1, 1926, II. Preliminary Review of Primary Experiments.

In order to show this trend more clearly than is readily apparent in Tables 10, 11, 12, and 13, a cross-tabulation of the same data has been made in Tables 14, 15, 16, and 17. From these tables Figures 14 and 15 have been drawn, showing graphically the variations in residual percentages of bacteria in the applied water coinciding with changes in raw-water turbidity (fig. 14) and in the density of raw-water bacteria (fig. 15), for each respective range in alum dosage.

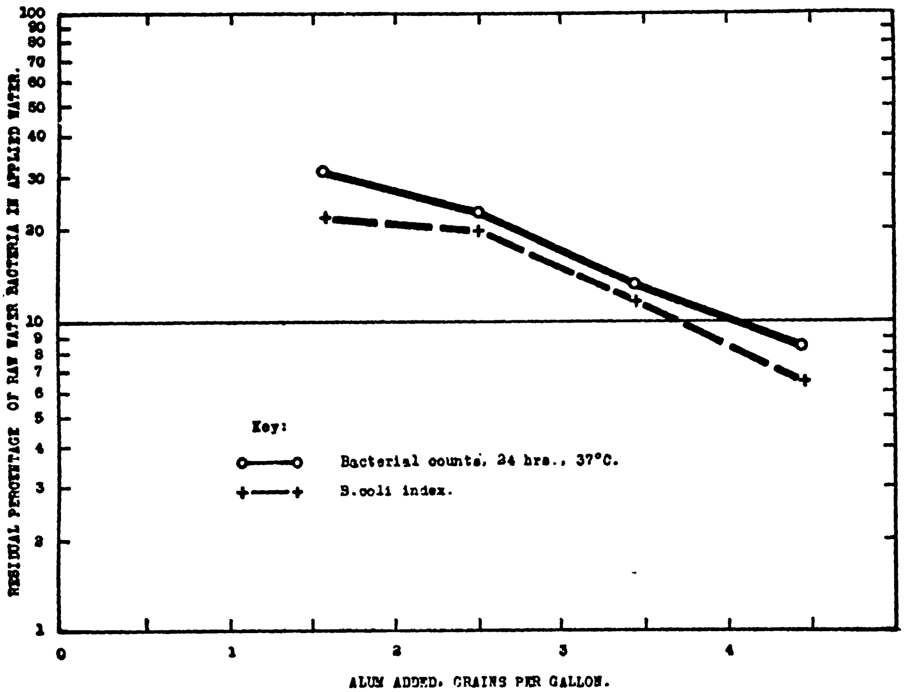


FIGURE 13.—Relation between amounts of alum added to raw water and residual percentages of bacteria observed in applied water, for all observations combined. (Plot of data given in Tables 10 and 11, Sections "D")

TABLE 14.—*Relation between raw-water turbidity and efficiency of bacterial removal, as observed within various ranges of alum added to raw water*

[Bacterial counts, 24 hours. 37° C.]

Raw-water turbidity range, p. p. m.	Number of results	Average alum added, g. p. g.	Average turbidity, p. p. m.	Average bacterial count per c. c.: Raw	Applied	Filtered	Chlorinated	Per cent of raw in—: Applied	Filtered	Chlorinated
A. ALUM ADDED: 0-2 G. P. G.										
0-10	2	1.5	10	10,900	4,250	313	51.0	39.0	2.9	0.47
11-100	76	1.5	42	10,100	3,320	321	24.0	32.9	3.2	.24
Over 100	53	1.6	296	10,500	1,520	217	14.0	14.5	2.1	.13
B. ALUM ADDED: 2-3 G. P. G.										
0-10	10	2.7	5	8,350	2,880	112	18.0	34.5	1.3	0.22
11-100	42	2.3	48	9,840	2,750	431	39.0	28.0	4.4	.40
Over 100	91	2.5	275	9,630	1,800	349	8.7	18.7	3.6	.09

Table 14.—*Relation between raw-water turbidity and efficiency of bacterial removal, as observed within various ranges of alum added to raw water*—Continued

C. ALUM ADDED: 3-4 G. P. G.

Raw-water turbidity range, p. p. m.	Number of results	Average alum added, g. p. g.	Average turbidity, p. p. m.	Average bacterial count per c. c.				Per cent of raw in—		
				Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
0-10	6	3.3	5	12,900	2,440	232	12.7	18.9	1.8	0.10
11-100	44	3.4	35	10,200	1,510	140	4.5	14.8	1.4	.04
Over 100	47	3.4	239	7,830	883	52	4.5	11.3	.66	.06

D. ALUM ADDED: OVER 4 G. P. G.

0-10	0	----	----	----	----	----	----	----	----	----
11-100	4	4.4	68	2,230	298	4	1.1	13.4	0.18	0.05
Over 100	7	4.5	236	4,040	251	11	.9	6.2	.27	.02

Table 15.—*Relation between raw-water turbidity and efficiency of B. coli removal, as observed within various ranges of alum added to raw water*

A. ALUM ADDED: 0-2 G. P. G.

Raw-water turbidity range p. p. m.	Number of results	Average alum added, g. p. g.	Average turbidity, p. p. m.	Average B. coli index per 100 c. c.				Per cent of raw in—		
				Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
0-10	2	1.5	10	32,500	30,300	550	2.7	93.3	1.70	0.008
11-100	76	1.5	42	42,500	11,700	119	3.2	27.5	.28	.008
Over 100	53	1.6	296	33,700	3,200	184	5.6	9.5	.55	.017

B. ALUM ADDED: 2-3 G. P. G.

0-10	10	2.7	5	43,700	13,400	19	2.3	30.7	0.04	0.005
11-100	42	2.3	48	31,300	8,000	92	5.3	25.6	.29	.017
Over 100	91	2.5	275	23,900	3,510	124	5.3	14.7	.52	.022

C. ALUM ADDED: 3-4 G. P. G.

0-10	6	3.3	5	122,000	11,200	174	1.1	9.2	0.14	0.001
11-100	44	3.4	35	39,700	5,640	90	.9	14.2	.23	.002
Over 100	47	3.4	239	19,500	2,080	34	1.9	10.7	.17	.010

D. ALUM ADDED: OVER 4 G. P. G.

0-10	0	----	----	----	----	----	----	----	----	----
11-100	4	4.4	68	24,100	2,340	16	1.0	9.7	0.07	0.004
Over 100	7	4.5	236	18,300	733	41	.2	4.0	.22	.001

TABLE 16.—*Relation between bacterial content of raw water and efficiency of bacterial removal, as observed within various ranges of alum added to raw water*

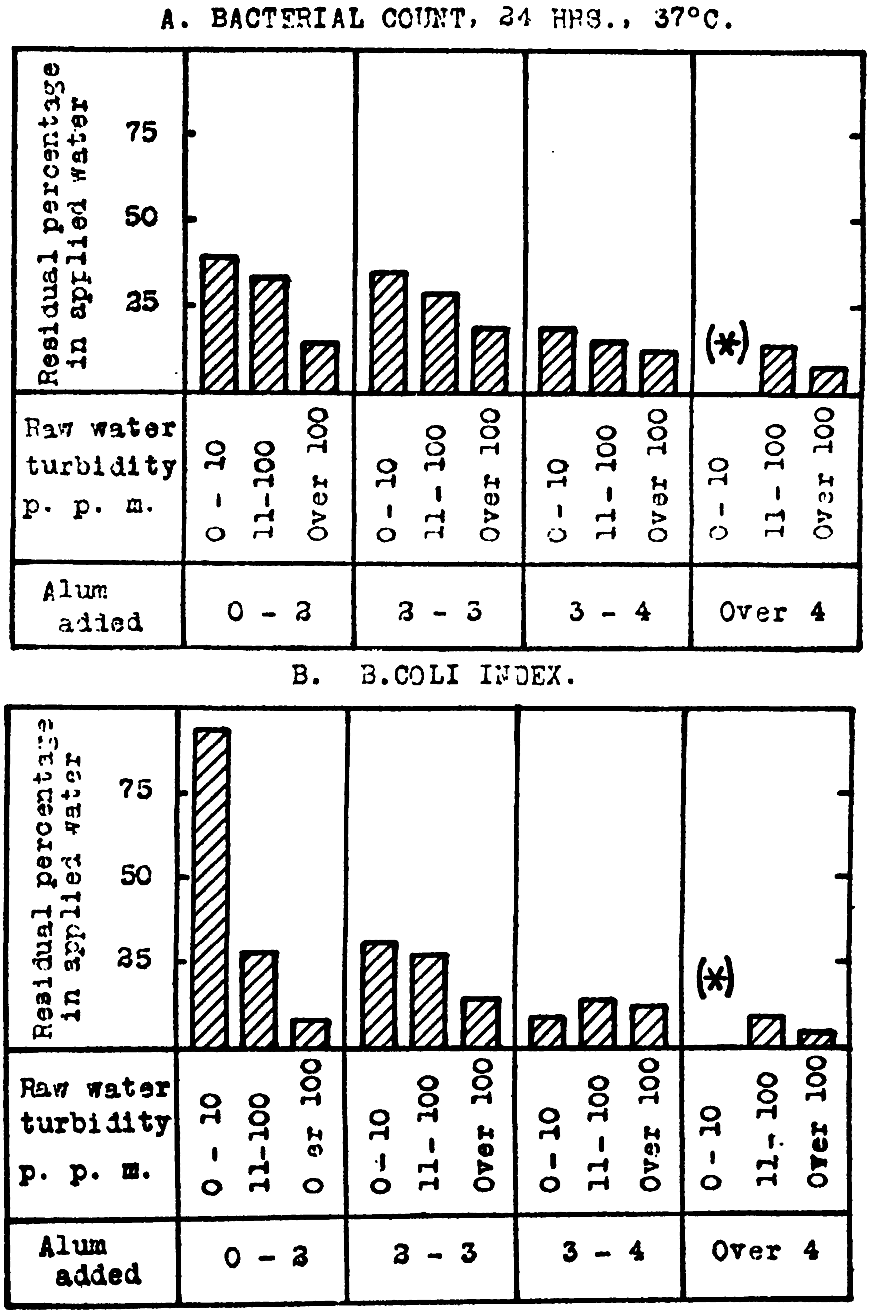
[Bacterial counts, 24 hours, 37° C.]

Raw-water bacterial count range	Number of results	Average alum added, g. p. g.	Average turbidity, p. p. m.	Average bacterial count per c. c.				Per cent of raw in—		
				Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
A. ALUM ADDED: 0–2 G. P. G.										
0–2,500	14	1.4	131	1,480	417	74	1.3	28.2	5.0	0.088
2,501–5,000	37	1.5	78	3,750	906	58	1.0	24.2	1.6	.027
5,001–10,000	30	1.5	196	7,420	1,580	171	6.4	21.3	2.3	.086
Over 10,000	50	1.6	166	19,400	4,950	477	26.0	25.5	2.5	.134
B. ALUM ADDED: 2–3 G. P. G.										
0–2,500	47	2.5	133	1,630	331	14	1.3	20.3	0.86	0.080
2,501–5,000	28	2.5	185	3,650	676	26	4.8	18.5	.71	.132
5,001–10,000	23	2.5	222	7,100	1,450	99	5.5	20.4	1.4	.077
Over 10,000	45	2.4	236	22,900	5,330	626	24.0	23.2	2.7	.104
C. ALUM ADDED: 3–4 G. P. G.										
0–2,500	17	3.4	114	1,900	249	6.5	0.9	13.1	0.34	0.047
2,501–5,000	25	3.4	182	3,570	403	17.5	.8	11.3	.49	.022
5,001–10,000	19	3.3	138	7,530	1,090	111.0	1.6	14.5	1.5	.021
Over 10,000	35	3.4	102	18,000	2,140	210.0	10.2	13.6	1.2	.057
D. ALUM ADDED: OVER 4 G. P. G.										
0–2,500	6	4.6	117	1,780	196	2.9	0.8	11.0	0.16	0.045
2,501–5,000	3	4.3	157	3,860	298	2.7	.8	7.7	.07	.021
5,001–10,000	2	4.2	375	7,410	442	39.0	1.7	5.9	.52	.023
Over 10,000	0	---	---	---	---	---	---	---	---	---

TABLE 17.—*Relation between B. coli content of raw water and efficiency of B. coli removal, as observed within various ranges of alum added to raw water*

Raw water B. coli index range	Number of results	Average alum added, g.p.g.	Average turbidity, p.p.m.	Average B. coli index per 100 c. c.				Per cent of raw in—		
				Raw	Applied	Filtered	Chlorinated	Applied	Filtered	Chlorinated
A. ALUM ADDED: 0–2 G. P. G.										
0–5,000	9	1.5	101	2,360	1,430	19.0	0.87	60.6	0.80	0.037
5,001–10,000	49	1.6	198	7,990	3,140	95.0	1.6	39.3	1.2	.020
10,001–50,000	40	1.5	130	34,200	10,100	165.0	2.1	29.5	.48	.006
Over 50,000	33	1.6	94	98,300	15,500	173.0	7.3	15.8	.18	.007
B. ALUM ADDED: 2–3 G. P. G.										
0–5,000	24	2.5	211	2,820	1,440	6.6	0.42	51.0	0.23	0.015
5,001–10,000	54	2.5	186	7,880	1,960	22.0	1.7	24.9	.28	.022
10,001–50,000	36	2.4	191	31,300	8,480	110.0	1.9	27.1	.35	.006
Over 50,000	29	2.4	177	79,500	10,500	284.0	14.0	13.2	.36	.018
C. ALUM ADDED: 3–4 G. P. G.										
0–5,000	11	3.5	241	2,720	958	32.0	0.32	35.2	1.2	0.012
5,001–10,000	37	3.4	147	7,940	2,660	35.0	.38	33.5	.44	.005
10,001–50,000	28	3.4	96	33,100	5,730	74.0	1.8	17.3	.22	.005
Over 50,000	20	3.4	95	107,000	6,880	129.0	1.5	6.4	.12	.001
D. ALUM ADDED: Over 4 G. P. G.										
0–5,000	4	4.5	196	3,630	882	1.4	0.25	24.3	0.04	0.007
5,001–10,000	1	4.8	91	5,500	775	29.0	2.0	14.1	.53	.036
10,001–50,000	5	4.2	186	30,200	1,970	69.0	.4	6.5	.23	.001
Over 50,000	1	4.9	116	52,800	325	1.5	.5	.6	.003	.001

On referring to Figures 14 and 15, a general tendency is noted toward a progressive decrease in the applied water bacterial residuals coincidently with increase in raw-water turbidity and in raw-water bac-



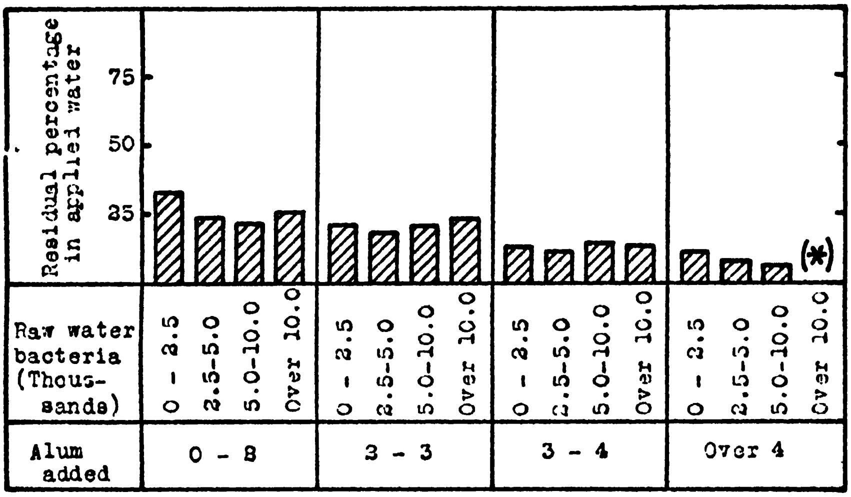
(*) No observations.

FIGURE 14.—Relation between raw-water turbidity and bacterial efficiency of coagulation-sedimentation, as observed within various ranges of alum added to raw water

terial content, though an exception is apparent in the residuals based on the 37° C. plate count in Figure 15, which do not show any well-marked

trend either downward or upward. With this exception, the tendency shown toward an increased bacterial efficiency of coagulation-sedimentation with increased turbidity and bacterial content of the raw water is similar to that previously observed in connection with these studies.

A. BACTERIAL COUNT, 34 HRS., 37°C.



(*) No observations.

B. B.COLI INDEX.

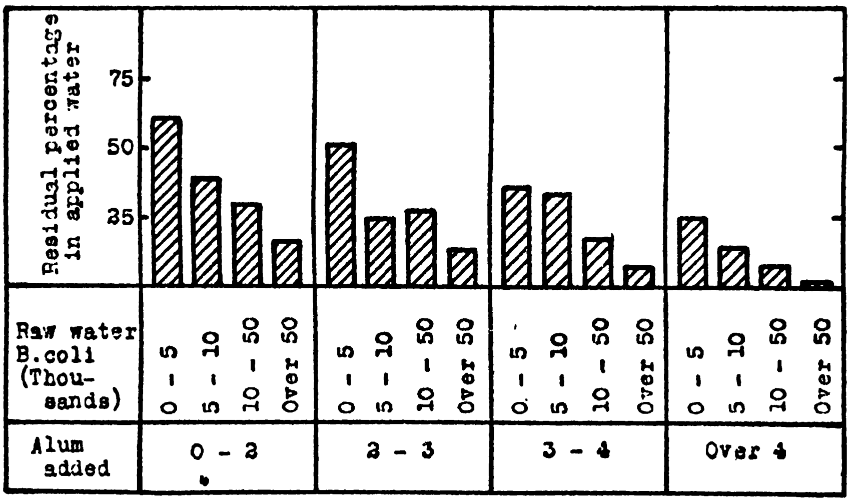


FIGURE 15.—Relation between bacterial content of raw water and bacterial efficiency of coagulation-sedimentation, as observed within various ranges of alum added to raw water. (Plot of data in Tables 14 and 15)

In Tables 14, 15, 16, and 17 a marked degree of irregularity is shown in the trends of the residual percentages of bacteria observed in the filtered and chlorinated effluents, in contrast to the fairly consistent

downward trends of the corresponding residuals in Tables 10, 11, 12, and 13. In so far as these observations are concerned, it thus is indicated that the bacterial efficiency of coagulation and sedimentation, though affected to a measurable degree, as a separate process, by variations in raw-water turbidity and bacterial content, is influenced, when combined with filtration, to a very considerably greater extent by changes in the amount of coagulant added to the raw water than by differences in its turbidity or bacterial content. This indication suggests very strongly that in the routine operation of rapid sand filtration plants the greater over-all bacterial efficiency usually experienced coincidently with increases in raw-water turbidity and bacteria

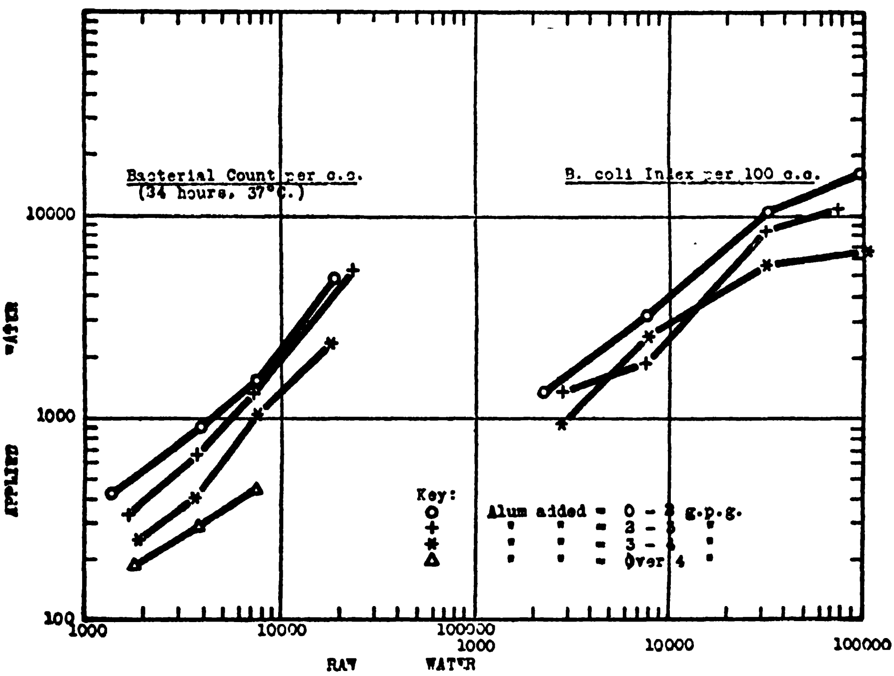


FIGURE 16.—Relation between bacterial content of raw and applied waters, with varying amounts of alum added to raw water. (Plot of data given in Tables 16 and 17)

content probably is due in no small measure to the use of larger amounts of coagulant at such times, though the concurrent influence of turbidity and bacterial density on the efficiency of the prefiltration stage of treatment doubtless also is an important factor in most cases.

Aside from considerations of bacterial efficiency, the data tabulated in Tables 16 and 17 show that an increase in the density of coagulant resulted in the production of an applied water of better quality, all other conditions being approximately equal. The relationship thus observed is indicated in Figure 16, in which the raw and applied water averages given in the two tables have been plotted against each other

on logarithmic scales. With a single exception (in the *B. coli* plots), an improvement in the quality of the applied water coincidently with the use of larger amounts of alum is consistently shown.

Summary and Conclusions

The experimental studies recorded in this paper have been concerned with the effects of variations in (*a*) the period of sedimentation, (*b*) the method of applying coagulant to the raw water, (*c*) the pH of the coagulation reaction, and (*d*) the density of coagulant added to the raw water, on the bacterial efficiency of coagulation-sedimentation as a preparatory treatment of water for rapid sand filtration and, incidentally, on the efficiency of the entire process of rapid sand filtration.

The experiments were carried out during portions of the three years, 1926, 1927, and 1928, at a fully equipped experimental rapid sand water filtration plant of 160,000 gallons daily capacity, designed to typify, as nearly as possible, current large-scale practice in this process of water purification, but with certain additional features incorporated in the plant for experimental purposes.

The results of the study yielded the following main conclusions:

(1) Substantial gains in the bacterial efficiency of coagulation-sedimentation resulted from prolongation of the nominal sedimentation period up to 8 or 9 hours, and measurable gains with periods up to 12 hours.

(2) Variations in the pH of the coagulation reaction from 5.6 to 6.9 produced little effect on the efficiency of coagulation-sedimentation. The efficiency became sharply diminished, however, with pH values exceeding 7.0 and slightly improved with pH values approaching 5.5.

(3) The bacterial efficiency of double-stage coagulation, with two separate stages of sedimentation, was consistently greater than that of single-stage coagulation with one stage of sedimentation. The observations indicated, however, that with the same total amount of coagulant and the same total period of sedimentation, little if any difference was observable between the results shown by double-stage and single-stage coagulation when carried out in conjunction with two separate stages of sedimentation.

(4) A fairly consistent relation was shown between the amounts of coagulant added to the raw water and the resulting bacterial efficiency, both of coagulation-sedimentation and of this stage in conjunction with filtration. This relationship was found to hold irrespective of raw-water turbidity or bacterial content, though it was more apparent when the turbidity and bacterial numbers were higher. Measurable gains in efficiency were shown with increases in coagulant density ranging up to 5 grains per gallon.

A general conclusion reached from the foregoing series of experiments was that the bacterial efficiency of rapid sand filtration processes can be increased very materially by means of longer periods of sedimentation and larger amounts of coagulant than ordinarily are used in current water purification practice. The economical limit of sedimentation appears to be reached somewhere between 8 and 12 hours, with little gain in efficiency beyond the upper limit of time stated.

COURT DECISION RELATING TO PUBLIC HEALTH

Protection of public water supply from contamination by unlawful bathing.—(Connecticut Supreme Court of Errors; Harvey Realty Co. *v.* Borough of Wallingford et al., 150 A. 60; decided Apr. 17, 1930.) The plaintiff corporation owned land upon which was a small pond. Water from this pond flowed through a brook to the reservoir and pumping station of the borough of Wallingford. The plaintiff set apart, for use by the public as a park, about 150 feet of the land all around the pond. The land back of this strip was divided into lots for sale. Large numbers of people were invited to come and bathe in the pond and the privilege of bathing therein was offered to the purchasers of the lots not bordering on the pond.

Section 2544 of the General Statutes provided as follows:

> Every person who shall bathe in any reservoir from which the inhabitants of any town, city or borough, are supplied with water, or in any lake, pond, or stream tributary to such reservoir, or who shall cast any filthy or impure substance into such reservoir, * * * shall be fined not more than $100 or imprisoned not more than six months, or both. * * *

The borough, through its water commissioners and superintendent of waterworks, called plaintiff's attention to the statute and also gave public notice that bathing in the pond would be a violation of the statute. Also the State commissioner of health caused notices to the same effect to be placed near the pond.

The plaintiff brought an action for an injunction to restrain the defendants—the borough, the water commissioners, the waterworks superintendent, and the State health commissioner—from interfering with the sale of its land and for damages. The borough filed a counterclaim, asking for an injunction against plaintiff's use of its premises as a pleasure resort or as a rendezvous for swimming, boating, or fishing or in a way that would render the waters unfit for water-supply purposes. The trial court found against the plaintiff in the action brought by it and in favor of the plaintiff on the counterclaim. The conclusions reached by the trial court were that the pond at the borough's pumping station constituted a reservoir within the meaning of section 2544; that the plaintiff's riparian ownership conferred only a

personal and family privilege of bathing in the pond; that the proposed according of the privilege to the public and lot owners who were not riparian proprietors was an unreasonable use; and that, since the pond was entirely surrounded by land owned by the plaintiff, none of the lot owners was a riparian proprietor having, as such, bathing rights in the pond. The plaintiff appealed, but the judgment against the borough on its counterclaim was not appealed from.

The appellate court held that the judgment of the trial court was correct. Portions of the opinion follow:

* * * A riparian proprietor is an owner of land bounded by a water course or lake or through which a stream flows, and riparian rights can be claimed only by such an owner. They are appurtenant only to lands which touch on the water course or through which it flows and which are used as a whole for a common purpose, not to any lands physically separated from the stream and the land bordering on it, although belonging to the same owner. * * * It is clear that the grantees or contractees, from the plaintiff, of lots separated from and not bordering on Pine Lake can have, of their own right, no riparian privileges in its waters. And any attempted transfer of the right made by a riparian to a nonriparian proprietor is invalid. [Citations.]

Each riparian proprietor has an equal right to the use of the water to drink and for the ordinary uses of domestic life, although such use may in some degree lessen the volume or affect the purity of the water, and this right to such use extends "both to the owner himself and all living things in his legitimate employment." 27 R. C. L. p. 1085. The right includes use of water for drinking, culinary, and other domestic purposes, and for watering of animals. [Cases cited.] The right, being to use "ad lavandum et potandum," logically includes ordinary and reasonable bathing privileges by the riparian owner, his family, and inmates and guests of his household, in the stream or pond as well as in waters drawn therefrom. The trial court states, and the record indicates, that this right of the plaintiff was not questioned or involved in the present action; the proposed extension of the privilege to the plaintiff's grantees of lots and to the general public was the subject of the defendant's objection and notice of intention to resist. * * *

Each riparian owner is limited to a reasonable use of the waters, with due regard to the rights and necessities of other such owners. It is the common right of all to have the stream preserved in its natural size, flow, and purity, without material diversion or pollution. A riparian proprietor has no property in the water itself, but a simple usufruct while it passes along. Though he may use the water while it runs over his land, as an incident to the land, he can not unreasonably detain, divert, or pollute it, unless he has a prior or special right to some exclusive or particular enjoyment. He must use and apply the water in a reasonable manner and so as not to destroy, or render useless, or materially diminish or affect, the legitimate application or use thereof by other riparian proprietors. [Cases cited.]

Application of these rules readily demonstrates that the uses contemplated and threatened by the plaintiff clearly were extraordinary and unreasonable. * * * The conclusions reached by the trial court as to this feature of the case were warranted in law and fact.

* * * The giving of notice of intention to protect the supply by preventing the contemplated injury by promiscuous bathing was not only fair to the plaintiff and prospective purchasers, but a proper means of minimizing damages. [Case cited.] The notices were appropriate, also, to a fulfillment of the duty resting

upon the defendants to adopt such precautionary measures as are reasonably proper and necessary to protect the community served by the water supply from risk of infection.

DEATHS DURING WEEK ENDED JUNE 28, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended June 28, 1930, and corresponding week of 1929. (From the Weekly Health Index, July 2, 1930, issued by the Bureau of the Census, Department of Commerce)

	Week ended June 28, 1930	Corresponding week, 1929
Policies in force	75, 988, 917	74, 459, 453
Number of death claims	12, 967	13, 504
Death claims per 1,000 policies in force, annual rate	8. 9	9. 5

Deaths from all causes in certain large cities of the United States during the week ended June 28, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, July 2, 1930, issued by the Bureau of the Census, Department of Commerce)

City	Week ended June 28, 1930		Annual death rate per 1,000, corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended June 28, 1930 [3]
	Total deaths	Death rate [1]		Week ended June 28, 1930	Corresponding week, 1929	
Total (65 cities)	6, 714	11. 8	11. 0	611	572	[3] 54
Akron	23			1	5	9
Albany [4]	30	13. 0	17. 3	7	3	153
Atlanta	116	23. 7	14. 7	22	12	233
White	65			6	7	190
Colored	51	(5)	(5)	16	5	254
Baltimore [4]	202	12. 7	11. 4	17	15	58
White	159			11	11	47
Colored	43	(5)	(5)	6	4	97
Birmingham	87	20. 4	13. 4	12	2	112
White	40			5	1	77
Colored	47	(5)	(5)	7	1	166
Boston	161	10. 5	11. 9	14	13	39
Bridgeport	22			2	4	34
Buffalo	135	12. 7	13. 8	7	11	31
Cambridge	31	12. 8	9. 1	3	5	56
Camden	30	11. 6	9. 2	5	2	91
Canton	20	8. 9	4. 5	0	1	0
Chicago [4]	596	9. 8	10. 2	35	64	31
Cincinnati	125			9	12	53
Cleveland	186	9. 6	7. 9	13	14	39
Columbus	70	12. 2	13. 4	6	6	59
Dallas	59	14. 1	10. 8	5	5	
White	43			4	5	
Colored	16	(5)	(5)	1	0	
Dayton	39	11. 0	14. 7	3	7	44
Denver	77	13. 6	15. 4	4	4	42
Des Moines	30	10. 3	11. 0	1	6	17
Detroit	261	9. 9	12. 0	38	45	59
Duluth	17	7. 6	11. 2	1	1	27
El Paso	48	21. 2	16. 8	19	5	
Erie	33			2	3	43
Fall River [4]	19	7. 4	6. 6	4	2	92
Flint	27	9. 5	12. 3	6	3	70
Fort Worth	28	8. 6	9. 2	3	3	
White	20			3	2	
Colored	8	(5)	(5)	0	1	
Grand Rapids	35	11. 1	7. 0	4	1	61
Houston	77			3	8	
White	50			2	7	
Colored	27	(5)	(5)	1	1	
Indianapolis	109	14. 9	12. 3	6	4	45
White	92			6	4	52
Colored	17	(5)	(5)	0	0	0
Jersey City	62	10. 0	10. 1	4	5	35
Kansas City, Kans	22	9. 7	11. 9	2	0	47
White	17			2	0	53
Colored	5	(5)	(5)	0	0	0
Kansas City, Mo	95	12. 7	12. 8	7	11	54

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended June 28, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929—Continued

City	Week ended June 28, 1930		Annual death rate per 1,000, corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended June 28, 1930 [2]
	Total deaths	Death rate [1]		Week ended June 28, 1930	Corresponding week, 1929	
Knoxville	23	11.4	9.4	5	3	117
White	18			2	3	52
Colored	5	(5)	(5)	3	0	741
Los Angeles	243			20	15	61
Louisville	69	10.9	13.6	5	7	43
White	51			4	6	40
Colored	18	(5)	(5)	1	1	72
Lowell	24			3	1	71
Lynn	19	9.4	7.4	0	1	0
Memphis	100	27.4	24.1	15	5	179
White	49			7	2	129
Colored	51	(5)	(5)	8	3	270
Milwaukee	110	10.5	7.9	11	20	55
Minneapolis	88	10.1	8.3	5	3	32
Nashville	59	22.0	22.0	7	10	108
White	35			2	5	41
Colored	24	(5)	(5)	5	5	317
New Bedford	20			2	1	51
New Haven	36	10.0	10.3	1	3	19
New Orleans	190	23.1	16.5	20	15	116
White	118			8	6	71
Colored	72	(5)	(5)	12	9	202
New York	1,378	11.9	10.5	128	99	54
Bronx Borough	192	10.5	7.8	13	3	31
Brooklyn Borough	450	10.2	9.4	33	41	35
Manhattan Borough	561	16.7	14.4	64	38	105
Queens Borough	130	7.9	8.2	16	15	46
Richmond Borough	45	15.6	10.7	2	2	37
Newark, N. J.	109	12.0	8.6	7	5	37
Oakland	46	8.8	10.1	1	4	12
Oklahoma City	35			8	5	157
Omaha	57	13.3	9.8	2	3	23
Paterson	32	11.5	9.4	3	4	52
Philadelphia	394	10.0	10.5	35	33	52
Pittsburgh	162	12.5	10.1	23	8	84
Portland, Oreg	65			2	5	25
Providence	57	10.4	7.8	5	10	46
Richmond	57	15.3	15.0	8	3	119
White	32			2	1	45
Colored	25	(5)	(5)	6	2	262
Rochester	63	10.0	9.4	6	9	53
St. Louis	263	16.2	11.8	15	14	49
St. Paul	58			6	1	61
Salt Lake City [4]	34	12.8	13.2	2	2	31
San Antonio	74	17.7	14.1	8	11	
San Diego	40			2	2	42
San Francisco	122	10.9	12.0	3	6	21
Schenectady	18	10.1	8.4	1	4	31
Seattle	57	7.8	11.3	3	5	30
Somerville	12	6.1	4.6	0	0	0
Spokane	28	13.4	12.9	1	1	26
Springfield, Mass	29	10.1	10.1	3	1	47
Syracuse	37	9.7	13.1	2	2	25
Tacoma	28	13.2	15.6	5	1	129
Toledo	55	9.2	10.3	8	8	73
Trenton	40	15.0	10.1	1	3	19
Utica	25	12.5	17.0	1	3	28
Washington, D. C	129	12.2	9.5	11	6	64
White	73			4	2	35
Colored	56	(5)	(5)	7	4	124
Waterbury	26			7	0	179
Wilmington, Del	24	9.7	11.8	2	3	45
Worcester	40	10.6	10.6	3	3	39
Yonkers	28	12.0	5.6	2	1	48
Youngstown	30	9.0	9.3	5	3	78

[1] Annual rate per 1,000 population.
[2] Deaths under 1 year per 1,000 births. Cities left blank are not in the registration area for births.
[3] Data for 73 cities.
[4] Deaths for week ended Friday.
[5] In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended June 28, 1930, and June 29, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 28, 1930, and June 29, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 28, 1930	Week ended June 29, 1929	Week ended June 28, 1930	Week ended June 29, 1929	Week ended June 28, 1930	Week ended June 29, 1929	Week ended June 28, 1930	Week ended June 29, 1929
New England States:								
Maine	1		2		39	84	0	1
New Hampshire	1				18	75	0	0
Vermont	1				21	1	0	0
Massachusetts	48	67			717	408	6	7
Rhode Island	7	5			25	26	0	0
Connecticut	4	29		1	24	49	0	1
Middle Atlantic States:								
New York	106	275	[1] 5	[1] 7	1,306	586	6	6
New Jersey	74	69	2		838	104	10	3
Pennsylvania	76	133			907	820	10	7
East North Central States:								
Ohio	32	55	10	4	378	878	7	7
Indiana	11	11			123	98	4	0
Illinois	122	155	25	8	285	1,114	5	12
Michigan	58	94	4		530	445	12	53
Wisconsin	5	18	6	5	429	761	2	7
West North Central States:								
Minnesota	11	11	1	3	74	127	0	2
Iowa	3	4			51	52	2	0
Missouri [2]	22	38			57	38	3	8
North Dakota	1	6			9	64	0	
South Dakota	2				46	8	0	1
Nebraska	6	7			30	46	0	1
Kansas	7	13		1	187	337	2	4
South Atlantic States:								
Delaware					3	8	0	0
Maryland [3]	10	24	2	5	25	15	0	0
District of Columbia	6	4			48	13	0	0
West Virginia	3	7	3	12	40	93	1	1
North Carolina	7	21	34		72	12	2	0
South Carolina	5	10	126	89			0	0
Georgia	4	9	9	9	84	21	4	1
Florida	8	5		4	36	12	0	0

[1] New York City only.
[2] Figures for 1930 are exclusive of Kansas City and Springfield.
[3] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 28, 1930, and June 29, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 28, 1930	Week ended June 29, 1929	Week ended June 28, 1930	Week ended June 29, 1929	Week ended June 28, 1930	Week ended June 29, 1929	Week ended June 28, 1930	Week ended June 29, 1929
East South Central States:								
Kentucky	3	5			22	20	0	0
Tennessee	3	5	20	5	47	6	1	2
Alabama	9	17	7	8	56	33	2	0
Mississippi	2	7					0	0
West South Central States:								
Arkansas	1	8		11	11	5	3	3
Louisiana	0	8	10	9	8	34	2	2
Oklahoma [4]	19	4	3	3	47	26	0	2
Texas	21	17	6	8	54	68	2	2
Mountain States:								
Montana		1			3	15	0	2
Idaho	2				2	8	1	0
Wyoming	1				38	13	0	0
Colorado	1	4		1	171	13	1	2
New Mexico	3	2			15	11	2	1
Arizona	4	3			48		1	2
Utah [3]	2	3	4	4	68	8	1	2
Pacific States:								
Washington	6	15			250	81	0	3
Oregon		5	1	9	96	87	0	0
California	52	58	26	21	924	96	3	6

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 28, 1930	Week ended June 29, 1929	Week ended June 28, 1930	Week ended June 29, 1929	Week ended June 28, 1930	Week ended June 29, 1929	Week ended June 28, 1930	Week ended June 29, 1929
New England States:								
Maine	0	0	13	8	0	0	1	10
New Hampshire	1	0	9	8	0	0	0	0
Vermont	0	0	2	3	0	0	0	0
Massachusetts	1	2	112	106	0	0	5	3
Rhode Island	0	0	6	4	0	0	1	1
Connecticut	1	2	20	16	0	0	1	0
Middle Atlantic States:								
New York	4	3	136	150	9	1	14	17
New Jersey	0	0	63	49	0	0	6	8
Pennsylvania	1	0	202	190	0	0	23	31
East North Central States:								
Ohio	3	0	152	128	58	46	7	20
Indiana	0	0	47	47	114	65	2	3
Illinois	3	2	209	203	63	79	13	10
Michigan	1	0	151	165	53	67	4	5
Wisconsin	2	0	65	90	14	14	1	1
West North Central States:								
Minnesota	0	0	36	56	4	7	4	3
Iowa	0	0	17	21	73	22	3	2
Missouri [2]	0	1	39	20	25	16	0	11
North Dakota	2	0	17	21	20	11	1	1
South Dakota	0	0	6	5	19	23	1	0
Nebraska	0	0	8	15	21	28	3	1
Kansas	0	0	26	53	57	44	3	8
South Atlantic States:								
Delaware	0	0	7	0	0	0	0	2
Maryland [3]	0	0	34	30	0	0	7	5
District of Columbia	0	0	7	5	0	0	0	1
West Virginia	0	0		9	15	17	10	8
North Carolina	6	5	13	13	13	0	46	36
South Carolina	1	1	4	4	1	1	60	59
Georgia	0	0	8	9	0	0	40	41
Florida	0	0	1	2	1	0	3	3

[2] Figures for 1930 are exclusive of Kansas City and Springfield.
[3] Week ended Friday.
[4] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 28, 1930, and June 29, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 28, 1930	Week ended June 29, 1929	Week ended June 28, 1930	Week ended June 29, 1929	Week ended June 28, 1930	Week ended June 29, 1929	Week ended June 28, 1930	Week ended June 29, 1929
East South Central States:								
Kentucky	0	0	23	31	2	6	10	4
Tennessee	2	2	15	5	3	0	35	36
Alabama	2	3	2	7	0	0	18	46
Mississippi	0	0	4	5	2	1	37	41
West South Central States:								
Arkansas	0	0	4	9	3	5	14	17
Louisiana	8	0	16	10	3	0	21	19
Oklahoma [4]	1	0	16	22	59	34	13	15
Texas	3	1	14	24	27	15	38	11
Mountain States:								
Montana	0	0	5	2	3	6	1	5
Idaho	0	0	1	1	3	9	2	0
Wyoming	0	0	2	6	2	12	0	4
Colorado	1	0	10	7	2	0	2	5
New Mexico	0	0	7	2	1	2	0	2
Arizona	0	0	5	1	4	1	15	38
Utah [3]	0	0	8	13	0	12	1	0
Pacific States:								
Washington	0	0	13	15	31	35	2	4
Oregon	0	0	10	11	21	19	3	1
California	77	3	66	185	41	18	21	11

[3] Week ended Friday.
[4] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April, 1930										
Hawaii Territory	5	31	7		76		3	5	0	10
May, 1930										
Alabama	15	30	171	468	554	113	3	47	25	43
California	13	225	82	6	8,858	12	58	531	259	53
Iowa	13	26		3	1,551		0	248	429	1
Louisiana [2]	11	50	88	113	134	93	11	58	61	93
Massachusetts	33	236	12		6,448		5	947	0	12
Montana	4	4	6		79		1	111	17	8
Nevada					82		0		51	
North Carolina	19	94	45		210	326	3	113	47	29
Oklahoma [1]	4	41	105	133	977	72	0	85	362	21
Oregon	1	19	57		420		0	71	106	6
South Dakota	2	15	11		409		0	58	171	
Virginia	6	68	785	62	2,505	82	3	104	23	33
Washington	16	28	38		2,807		1	130	221	11
Wisconsin	13	72	47		3,516		1	822	68	11

[1] Exclusive of Oklahoma City and Tulsa.
[2] Diagnosis of leprosy in a case reported in Louisiana in February and published in the PUBLIC HEALTH REPORTS dated Apr. 4, 1930, was not confirmed by later examination.

April, 1930

Hawaii Territory:	Cases
Chicken pox	48
Conjunctivitis, follicular	57
Dysentery (bacillary)	1
Hookworm disease	2
Leprosy	7
Mumps	19
Tetanus	3
Trachoma	2
Whooping cough	27

May, 1930

	Cases
Chicken pox:	
Alabama	186
California	1,391
Iowa	227
Louisiana	83
Massachusetts	848
Montana	42
Nevada	19
North Carolina	641
Oklahoma [1]	52
Oregon	198
South Dakota	70
Virginia	579
Washington	344
Wisconsin	1,245
Dengue:	
Alabama	1
Oklahoma [1]	1
Dysentery:	
California (amebic)	4
California (bacillary)	5
Louisiana	8
Oklahoma [1]	10
Dysentery and diarrhea:	
Virginia	730
Food poisoning:	
California	10
German measles:	
California	51
Iowa	1
Massachusetts	1,373
Montana	3
North Carolina	418
Washington	236
Wisconsin	109
Granuloma, coccidioidal:	
California	2
Hookworm disease:	
California	1
Louisiana	200
Impetigo contagiosa:	
Oregon	10
Lead poisoning:	
Massachusetts	4
Leprosy: [2]	
California	2
Lethargic encephalitis:	
Alabama	8
California	3
Louisiana	4
Massachusetts	6
Lethargic encephalitis—Continued.	
Oregon	3
Washington	2
Wisconsin	4
Mumps:	
Alabama	103
California	2,762
Iowa	130
Louisiana	24
Massachusetts	667
Montana	165
Nevada	37
Oklahoma [1]	9
Oregon	128
South Dakota	36
Washington	437
Wisconsin	1,036
Ophthalmia neonatorum:	
California	1
Louisiana	1
Massachusetts	165
Montana	1
Wisconsin	1
Paratyphoid fever:	
California	2
Puerperal septicemia:	
Oregon	1
Washington	1
Rabies in animals:	
California	51
Louisiana	10
Rocky Mountain spotted or tick fever:	
Montana	5
Nevada	9
Oregon	23
Washington	1
Scabies:	
Oregon	4
Septic sore throat:	
Louisiana	2
Massachusetts	19
North Carolina	7
Oklahoma [1]	35
Washington	1
Tetanus:	
California	1
Louisiana	12
Massachusetts	4
Oklahoma [1]	3
Trachoma:	
California	9
Massachusetts	3
Oklahoma [1]	5
South Dakota	3
Trichinosis:	
California	4
Tularæmia:	
California	3
Nevada	3
Virginia	2
Typhus fever:	
Alabama	6
Massachusetts	1
Virginia	4

[1] Exclusive of Oklahoma City and Tulsa.

[2] Diagnosis of leprosy in a case reported in Louisiana in February and published in the Public Health Reports dated Apr. 4, 1930, was not confirmed by later examination.

Undulant fever:	Cases
Alabama	4
California	6
Iowa	13
Massachusetts	1
Montana	1
Oregon	3
Virginia	4
Washington	2
Vincent's angina:	
Iowa	1
Oklahoma [1]	1
Oregon	9
Washington	97

Whooping cough:	Cases
Alabama	161
California	1,088
Iowa	65
Louisiana	39
Massachusetts	1,171
Montana	36
Nevada	17
North Carolina	1,380
Oklahoma	80
Oregon	214
South Dakota	59
Virginia	803
Washington	395
Wisconsin	847

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of May, 1930, by departments of health of certain States to other State health departments

Disease	California	Illinois	Kansas	Massachusetts	Minnesota	New Jersey	New York
Actinomycosis					1		
Chicken pox		1					
Diphtheria							2
Gonorrhea					2		
Measles							2
Meningococcus meningitis					1		1
Paratyphoid fever		1					
Rocky Mountain spotted fever	2						
Scarlet fever						1	
Smallpox	2	8					3
Syphilis			2		3		
Tuberculosis	5	18			23		
Typhoid fever	2	4		1			1

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,660,000. The estimated population of the 88 cities reporting deaths is more than 30,065,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended June 21, 1930, and June 22, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	851	1,247	
95 cities	415	677	694
Measles:			
45 States	10,437	7,485	
95 cities	4,047	2,561	
Meningococcus meningitis:			
46 States	111	199	
95 cities	55	84	
Poliomyelitis:			
47 States	105	22	
Scarlet fever:			
46 States	2,011	2,377	
95 cities	883	893	722
Smallpox:			
46 States	995	635	
95 cities	60	55	43
Typhoid fever:			
46 States	412	391	
95 cities	46	49	69
Deaths reported			
Influenza and pneumonia:			
88 cities	440	492	
Smallpox:			
88 cities	0	0	

[1] Exclusive of Oklahoma City and Tulsa.

City reports for week ended June 21, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	6	0	0		0	2	15	5
New Hampshire:								
Concord	0	0	0		0	1	0	1
Manchester	0	0	0		0	0	0	2
Nashua	0	0	1		0	5	0	0
Vermont:								
Barre	1	0	0		0	10	0	0
Burlington	0	0	0		0	0	0	0
Massachusetts:								
Boston	50	30	15		0	328	32	13
Fall River	5	2	0		0	1	7	1
Springfield	10	2	0	1	1	6	6	3
Worcester	33	2	0		0	109	0	1
Rhode Island:								
Pawtucket	4	1	0		0	0	0	1
Providence	14	4	1		0	1	0	3
Connecticut:								
Bridgeport	2	4	0		0	3	0	0
Hartford	4	3	0		0	2	0	1
New Haven	12	1	0		0	10	5	2
MIDDLE ATLANTIC								
New York:								
Buffalo	24	10	14		0	14	9	9
New York	216	221	91	8	7	1,161	0	108
Rochester	6	8	3		0	13	1	2
Syracuse	40	3	1		0	35	37	1
New Jersey:								
Camden	5	6	2	1	1	9	0	0
Newark	19	10	24		0	90	8	3
Trenton	3	2	1		0	11	2	1
Pennsylvania:								
Philadelphia	68	50	14	6	2	255	85	28
Pittsburgh	26	15	18		1	120	8	17
Reading	5	2	1		0	3	8	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	2	5	2		3	44	8	2
Cleveland	105	23	13		0	7	23	10
Columbus	5	2	2	1	1	69	4	1
Toledo	20	4	3	3	3	23	3	1
Indiana:								
Fort Wayne	4	1	1		0	0	0	0
Indianapolis	8	2	0		0	32	0	9
South Bend	0	1	2		0	2	0	0
Terre Haute	1	0	0		0	33	0	1
Illinois:								
Chicago	83	76	100	1	1	45	97	30
Springfield	3	0	0	1	1	37	1	1

City reports for week ended June 21, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST NORTH CENTRAL—continued								
Michigan:								
Detroit	46	38	27	1	0	179	51	19
Flint	8	2	0	...	0	119	0	6
Grand Rapids	3	1	0	...	0	3	0	1
Wisconsin:								
Kenosha	1	0	0	...	0	1	0	0
Madison	1	0	0	...	...	5	1	...
Milwaukee	115	11	2	1	1	21	78	2
Racine	11	1	0	...	0	16	0	1
Superior	0	0	0	...	0	0	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	4	1	0	...	0	13	0	1
Minneapolis	23	11	1	...	0	19	2	3
St. Paul	32	7	1	...	0	6	2	4
Iowa:								
Des Moines	2	1	0	...	...	3	0	...
Sioux City	2	1	0	...	...	10	0	...
Waterloo	3	0	0	...	...	0	0	...
Missouri:								
Kansas City	...	2	...	...	...	...	...	...
St. Joseph	1	0	1	...	0	0	0	2
St. Louis	34	22	7	...	...	52	11	...
North Dakota:								
Fargo	2	1	0	...	0	0	5	0
Grand Forks	0	0	0	...	...	0	0	...
South Dakota:								
Aberdeen	1	0	0	...	...	64	0	...
Sioux Falls	0	0	0	...	...	4	0	...
Nebraska:								
Lincoln	8	0	1	...	...	1	1	...
Omaha	1	2	3	...	0	8	0	5
Kansas:								
Topeka	3	1	0	3	0	17	0	4
Wichita	0	0	1	...	0	31	1	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	1	0	...	0	1	1	0
Maryland:								
Baltimore	75	16	12	2	1	17	16	16
Cumberland	0	0	0	...	0	2	0	0
Frederick	0	0	0	...	0	0	0	0
District of Columbia:								
Washington	23	6	2	...	0	65	0	5
Virginia:								
Lynchburg	4	0	0	...	0	17	0	1
Norfolk	0	0	0	...	0	1	0	3
Richmond	2	2	0	...	0	6	0	1
Roanoke	3	0	0	...	0	35	1	2
West Virginia:								
Charleston	2	0	0	1	0	0	0	0
Wheeling	6	1	0	...	0	8	0	1
North Carolina:								
Raleigh	1	0	0	...	0	0	0	0
Wilmington	0	0	0	...	0	0	0	0
Winston-Salem	...	0	...	...	...	...	...	...
South Carolina:								
Charleston	0	0	0	4	0	2	2	1
Columbia	2	0	0	...	0	1	4	0
Georgia:								
Atlanta	2	1	2	4	0	18	5	0
Brunswick	1	0	0	...	0	0	0	0
Savannah	0	0	1	...	0	7	0	0
Florida:								
Miami	0	1	0	...	0	2	1	2
St. Petersburg	...	0	...	...	0	...	...	0
Tampa	0	1	1	...	0	26	0	1

City reports for week ended June 21, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	1	0	4
Tennessee:								
Memphis	6	0	1		0	0	0	7
Nashville	2	0	1		0	13	0	5
Alabama:								
Birmingham	2	1	0	2	2	25	1	2
Mobile	0	0	0		0	0	0	0
Montgomery	1	0	0			1	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	1	0	1			8	0	
Little Rock	0	0	0		0	0	0	0
Louisiana:								
New Orleans	0	5	7	2	1	3	0	4
Shreveport	0	0	0		0	3	2	2
Oklahoma:								
Oklahoma City	0	0	0	1	1	2	0	5
Tulsa	0	0	0			1	0	
Texas:								
Dallas	0	3	10		0	7	2	4
Fort Worth	0	1	0		0	0	0	0
Galveston	0	0	0		0	0	0	0
Houston	3	2	2		0	1	0	6
San Antonio	0	2	3		1	0	0	2
MOUNTAIN								
Montana:								
Billings	0	0	0		0	9	1	2
Great Falls	1	0	0		0	1	0	0
Helena	0	1	0		0	0	0	0
Missoula	0	0	0		0	5	1	0
Idaho:								
Boise	0	0	0		0	9	0	2
Colorado:								
Denver	14	8	0		0	115	6	5
Pueblo	2	1	0		0	55	17	2
New Mexico:								
Albuquerque	2	0	0		0	6	2	0
Arizona:								
Phoenix	0	0	0		0	0	0	1
Utah:								
Salt Lake City	12	3	1		0	110	5	4
Nevada:								
Reno		0						
PACIFIC								
Washington:								
Seattle	14	3	1			156	37	
Spokane	14	2	1			31	0	
Tacoma	3	2	2		0	76	0	1
Oregon:								
Portland	3	6	2	1	0	34	7	5
Salem	10	0	0		0	1	1	0
California:								
Los Angeles	36	33	14	15	0	206	59	19
Sacramento	1	2	3		0	23	7	2
San Francisco	15	11	2		0	36	26	2

City reports for week ended June 21, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	1	3	0	0	0	0	0	0	0	5	22
New Hampshire:											
Concord	0	0	0	0	0	1	0	0	0	0	9
Manchester	1	0	0	0	0	0	0	0	0	0	11
Nashua	0	0	0	0	0	0	0	0	0	0	-------
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	2
Burlington	0	0	0	0	0	0	0	0	0	0	11
Massachusetts:											
Boston	44	28	0	0	0	12	2	0	0	47	198
Fall River	2	2	0	0	0	2	1	0	1	4	25
Springfield	4	2	0	0	0	1	0	0	0	6	26
Worcester	6	3	0	0	0	1	0	0	0	9	28
Rhode Island:											
Pawtucket	1	1	0	0	0	0	0	0	0	0	20
Providence	5	6	0	0	0	3	0	0	0	6	56
Connecticut:											
Bridgeport	5	3	0	0	0	4	0	0	0	0	23
Hartford	3	0	0	0	0	3	0	0	0	0	31
New Haven	2	4	0	0	0	3	1	0	0	12	49
MIDDLE ATLANTIC											
New York:											
Buffalo	18	3	0	1	0	6	1	0	0	18	109
New York	146	106	0	0	0	92	12	6	2	100	1,321
Rochester	6	9	0	0	0	1	0	0	0	2	64
Syracuse	4	8	0	0	0	1	0	0	0	53	46
New Jersey:											
Camden	4	1	0	0	0	1	0	0	0	3	34
Newark	16	16	0	0	0	7	0	0	0	35	78
Trenton	2	6	0	0	0	6	1	0	0	0	34
Pennsylvania:											
Philadelphia	54	74	0	0	0	26	3	0	0	22	415
Pittsburgh	20	21	0	0	0	7	0	3	0	34	147
Reading	2	3	0	0	0	3	0	0	0	5	19
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	7	7	2	0	0	11	0	1	0	3	130
Cleveland	26	44	0	4	0	10	2	1	0	75	173
Columbus	4	1	1	0	0	3	1	0	0	9	78
Toledo	7	23	0	4	0	4	0	0	0	1	63
Indiana:											
Fort Wayne	1	2	1	3	0	1	0	0	0	2	23
Indianapolis	5	17	5	3	0	1	0	0	0	17	-------
South Bend	1	3	0	0	0	1	0	0	0	0	13
Terre Haute	1	1	1	0	0	0	0	0	0	1	15
Illinois:											
Chicago	79	160	2	0	0	40	3	2	1	76	608
Springfield	2	0	0	0	0	0	0	0	0	6	23
Michigan:											
Detroit	60	76	1	1	0	28	2	0	1	156	263
Flint	5	15	1	1	0	1	0	0	1	12	30
Grand Rapids	4	12	0	0	0	2	0	0	0	1	41
Wisconsin:											
Kenosha	0	2	0	0	--------	0	0	0	0	6	8
Madison	0	2	0	0	--------	0	0	0	0	11	-------
Milwaukee	17	17	0	0	0	6	1	0	0	52	101
Racine	2	8	0	0	0	0	0	0	0	10	8
Superior	3	0	0	0	0	2	0	0	0	0	7

City reports for week ended June 21, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL											
Minnesota:											
Duluth	6	2	0	0	0	0	0	0	0	7	22
Minneapolis	21	7	2	0	0	4	1	0	0	1	97
St. Paul	13	4	0	0	0	2	1	0	0	5	53
Iowa:											
Des Moines	4	2	2	28			0	0		0	27
Sioux City	0	4	1	6			0	0		4	
Waterloo	1	0	1	2			0	0		1	
Missouri:											
Kansas City	4		0				1				
St. Joseph	0	4	1	0	0	1	0	0	0	0	23
St. Louis	15	40	1	1	0	8	2	1	0	10	220
North Dakota:											
Fargo	1	0	0	0	0	1	0	0	0	6	7
Grand Forks	0	0	0	1			0	0		0	
South Dakota:											
Aberdeen	1	0	0	3			0	0		0	
Sioux Falls	0	0	0	6			0	0		0	
Nebraska:											
Lincoln	1	8	1	1			0	0		10	
Omaha	2	5	2	4	0	1	0	0	0	0	54
Kansas:											
Topeka	1	1	0	0	0	2	0	1	0	22	23
Wichita	1	2	0	1	0	1	0	2	0	1	32
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	6	0	0	0	1	1	0	0	5	27
Maryland:											
Baltimore	16	30	0	0	0	8	2	1	1	25	164
Cumberland	0	0	0	0	0	0	0	0	0	0	8
Frederick	0	0	0	0	0	0	0	0	0	0	2
District of Columbia:											
Washington	11	4	1	0	0	13	1	1	1	2	135
Virginia:											
Lynchburg	1	0	0	0	0	0	0	2	0	10	19
Norfolk	1	0	0	0	0	3	0	2	0	0	
Richmond	1	5	0	0	0	5	1	0	0	2	56
Roanoke	0	0	0	0	0	0	0	0	0	4	14
West Virginia:											
Charleston	0	1	1	0	0	2	1	0	0	2	21
Wheeling	1	1	0	0	0	0	0	0	0	2	14
North Carolina:											
Raleigh	0	0	0	1	0	1	0	2	0	7	11
Wilmington	0	0	0	0	0	0	0	0	0	5	12
Winston-Salem	0		0				0				
South Carolina:											
Charleston	0	0	1	0	0	0	1	0	0	8	18
Columbia	0	1	0	0	0	1	2	2	0	0	12
Georgia:											
Atlanta	3	4	2	0	0	6	3	1	1	5	82
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	0	0	0	0	0	1	1	1	0	0	35
Florida:											
Miami	0	0	0	0	0	0	0	1	0	0	31
St. Petersburg	0		0		0	0	0		1		11
Tampa	0	1	0	0	0	4	1	0	0	1	17
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	0	0	0	0	1	0	0	0	0	31
Tennessee:											
Memphis	2	4	0	0	0	3	3	1	0	9	81
Nashville	0	1	1	0	0	3	2	2	0	2	42
Alabama:											
Birmingham	1	4	2	0	0	4	2	5	0	20	63
Mobile	0	1	0	1	0	0	2	0	1	0	25
Montgomery	0	0	0	2			0	0		0	

City reports for week ended June 21, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	-------	-------	1	0	-------	10	-------
Little Rock	0	1	0	0	0	6	1	2	1	0	-------
Louisiana:											
New Orleans	3	18	0	0	0	16	3	2	2	6	150
Shreveport	1	2	1	1	0	2	0	1	0	0	30
Oklahoma:											
Oklahoma City	0	2	1	12	0	4	1	0	0	0	39
Tulsa	0	4	0	1	-------	-------	2	0	-------	1	-------
Texas:											
Dallas	2	5	1	1	0	3	2	1	1	4	61
Fort Worth	0	0	2	0	0	0	1	0	0	0	33
Galveston	0	0	0	0	0	2	0	0	0	1	14
Houston	1	1	1	4	0	5	1	0	0	0	75
San Antonio	0	1	0	1	0	4	1	1	0	4	82
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	6
Great Falls	0	9	0	0	0	0	0	0	0	0	8
Helena	0	1	0	0	0	0	0	0	0	0	3
Missoula	0	0	0	4	0	0	0	0	0	0	3
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	1	6
Colorado:											
Denver	7	12	0	0	0	8	1	0	0	42	68
Pueblo	1	0	0	0	0	0	0	0	0	0	6
New Mexico:											
Albuquerque	1	0	0	0	0	3	0	0	0	0	-------
Arizona:											
Phoenix	1	0	0	0	0	4	0	0	0	0	21
Utah:											
Salt Lake City	2	1	1	0	0	3	0	1	0	38	32
Nevada:											
Reno	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
PACIFIC											
Washington:											
Seattle	5	5	1	1	-------	-------	0	1	-------	13	-------
Spokane	3	0	3	4	-------	-------	0	0	-------	9	-------
Tacoma	2	0	2	2	0	2	0	0	0	2	19
Oregon:											
Portland	3	0	7	4	0	2	0	1	0	10	-------
Salem	1	0	0	0	0	0	0	0	0	6	-------
California:											
Los Angeles	22	20	3	8	0	22	2	1	0	25	295
Sacramento	2	3	1	3	0	1	0	1	0	1	27
San Francisco	12	8	0	0	0	13	1	0	0	4	157

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Connecticut:									
Hartford	0	1	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	1	0	0	0	0	0	0	0
New York	9	3	4	0	0	0	2	1	0
Pennsylvania:									
Philadelphia	1	0	0	0	0	0	0	0	0
Pittsburgh	3	1	0	0	0	0	0	0	0

City reports for week ended June 21, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	0	0	0
Cleveland	2	0	0	0	0	0	1	0	0
Indiana:									
Indianapolis	1	0	0	0	0	0	0	0	0
South Bend	1	0	0	0	0	0	0	0	0
Illinois:									
Chicago	5	3	1	0	0	0	0	0	0
Michigan:									
Detroit	9	4	0	0	0	0	1	0	0
Wisconsin:									
Milwaukee	1	1	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
St. Paul	1	0	1	1	0	0	0	0	0
Missouri:									
St. Louis	3	0	0	0	0	0	0	0	0
Nebraska:									
Omaha	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
District of Columbia:									
Washington	1	0	0	0	0	0	0	0	0
Virginia:									
Roanoke	0	0	0	0	0	1	0	0	1
North Carolina:									
Wilmington	0	0	0	0	4	1	0	0	0
South Carolina:									
Charleston	1	1	0	0	15	0	0	0	0
Columbia	0	0	0	0	0	3	0	0	0
Georgia:									
Atlanta	2	0	0	0	1	1	0	0	0
EAST SOUTH CENTRAL									
Kentucky:									
Covington	0	2	0	0	0	0	0	0	0
Tennessee:									
Memphis	7	1	0	0	0	0	0	0	0
Alabama:									
Birmingham	1	0	0	0	0	1	0	1	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
New Orleans	0	0	0	0	7	3	0	0	0
Shreveport	0	0	0	0	0	0	0	4	0
Texas:									
Dallas	1	1	0	0	2	2	0	0	0
Fort Worth	0	0	0	0	0	2	0	0	0
Houston	0	0	0	0	1	1	0	0	0
MOUNTAIN									
Arizona:									
Phoenix	0	1	0	0	0	0	0	0	0
Utah:									
Salt Lake	1	0	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Spokane	1	0	0	0	0	0	0	0	0
Oregon:									
Portland	1	0	0	0	0	0	0	0	0
California:									
Los Angeles	1	1	0	0	0	0	0	17	3
Sacramento	1	0	0	0	0	0	0	1	0
San Francisco	0	2	1	0	0	2	0	0	0

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended June 21, 1930, compared with those for a like period ended June 22, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, May 18 to June 21, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929
98 cities	81	135	77	124	77	110	[2] 80	106	[3] 68	112
New England	62	108	51	90	86	72	[4] 36	79	35	74
Middle Atlantic	80	188	71	168	72	148	82	131	81	125
East North Central	117	165	111	155	113	123	129	145	93	165
West North Central	70	100	76	110	51	96	[5] 54	65	[6] 31	87
South Atlantic	49	49	55	41	49	54	[7] 40	64	[7] 34	64
East South Central	27	14	40	7	13	21	13	41	13	34
West South Central	56	46	52	57	41	88	86	84	86	65
Mountain	51	61	43	35	60	61	[8] 35	35	[8] 9	26
Pacific	69	60	78	58	76	56	43	34	54	58

MEASLES CASE RATES

	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929
98 cities	1,185	903	932	659	957	734	[2] 838	483	[3] 667	423
New England	1,719	552	1,426	364	1,462	602	[4] 1,401	337	1,048	391
Middle Atlantic	1,150	196	991	183	1,076	169	1,089	143	818	123
East North Central	692	2,286	529	1,597	517	1,827	457	1,152	381	1,010
West North Central	778	1,441	514	1,033	412	1,060	[5] 369	581	[6] 347	504
South Atlantic	875	242	725	298	478	238	[7] 374	242	[7] 387	129
East South Central	641	27	378	55	418	41	182	41	270	41
West South Central	587	430	486	236	123	400	101	209	82	183
Mountain	6,934	313	5,527	252	5,630	192	[8] 3,386	261	[8] 2667	218
Pacific	2,544	529	1,630	398	2,220	408	1,564	384	1,247	352

SCARLET FEVER CASE RATES

	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929
98 cities	210	268	186	269	214	209	[2] 193	188	[3] 145	148
New England	288	281	281	269	230	191	[4] 200	204	115	159
Middle Atlantic	215	196	171	193	196	135	155	129	118	100
East North Central	229	449	142	447	296	321	304	322	229	260
West North Central	300	208	209	179	260	165	[5] 242	110	[6] 154	77
South Atlantic	150	159	115	273	156	300	[7] 149	133	[7] 100	73
East South Central	115	137	81	123	108	96	54	75	67	89
West South Central	52	118	15	160	78	76	37	107	105	88
Mountain	292	113	94	96	240	78	[8] 123	70	[8] 202	96
Pacific	113	336	83	246	109	270	113	251	85	210

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1930 and 1929, respectively.
[2] Barre, Vt., Omaha, Nebr., Winston-Salem, N. C., and Reno, Nev., not included.
[3] Kansas City, Mo., Winston-Salem, N. C., and Reno, Nev., not included.
[4] Barre, Vt., not included.
[5] Omaha, Nebr., not included.
[6] Kansas City, Mo., not included.
[7] Winston-Salem, N. C., not included.
[8] Reno, Nev., not included.

Summary of weekly reports from cities, May 18 to June 21, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

SMALLPOX CASE RATES

	Week ended—									
	May 24, 1930	May 25, 1929	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929
98 cities	20	14	16	9	21	8	[2] 13	16	[3] 10	9
New England	0	7	0	0	0	0	[4] 0	0	0	0
Middle Atlantic	0	0	1	0	1	0	0	0	0	0
East North Central	10	20	13	15	8	17	11	28	8	18
West North Central	108	15	55	15	116	12	[5] 37	12	[6] 31	6
South Atlantic	2	4	9	0	4	2	[7] 8	4	[7] 2	6
East South Central	34	27	34	7	34	14	40	55	20	0
West South Central	11	15	15	19	22	8	22	42	26	4
Mountain	69	35	60	52	112	52	[8] 26	44	[8] 35	61
Pacific	83	75	57	27	68	14	57	46	43	31

TYPHOID FEVER CASE RATES

98 cities	7	8	7	7	8	8	[2] 9	9	[3] 8	8
New England	18	7	11	2	4	7	[4] 9	11	0	4
Middle Atlantic	4	5	3	3	6	5	8	3	4	2
East North Central	5	3	3	3	4	3	4	4	3	4
West North Central	8	8	9	17	9	8	[5] 6	17	[6] 9	19
South Atlantic	11	15	13	19	20	17	[7] 15	11	[7] 19	13
East South Central	27	75	40	34	13	27	27	34	54	55
West South Central	11	11	22	19	37	27	19	19	26	34
Mountain	0	17	9	0	0	0	[8] 9	9	[8] 9	9
Pacific	7	10	9	2	2	12	19	19	7	5

INFLUENZA DEATH RATES

91 cities	6	10	4	7	5	7	[2] 7	6	[3] 4	6
New England	4	7	0	7	0	2	[4] 2	7	2	2
Middle Atlantic	8	8	4	4	4	5	5	4	5	3
East North Central	5	8	4	9	4	6	6	8	4	8
West North Central	0	15	3	3	12	3	[5] 17	9	[6] 0	6
South Atlantic	5	6	4	6	9	7	[7] 2	2	[7] 2	6
East South Central	22	45	37	0	15	22	15	7	15	15
West South Central	8	27	4	12	11	16	27	12	8	16
Mountain	9	9	17	17	9	35	[8] 0	0	[8] 0	0
Pacific	6	6	3	16	3	16	6	6	0	6

PNEUMONIA DEATH RATES

91 cities	103	116	80	105	86	90	[2] 85	86	[3] 72	81
New England	100	121	89	106	73	65	[4] 80	85	69	56
Middle Atlantic	137	129	94	113	106	105	101	98	82	89
East North Central	80	118	54	101	59	96	67	82	53	76
West North Central	83	123	68	120	130	81	[5] 82	54	[6] 81	48
South Atlantic	101	94	82	112	93	67	[7] 72	88	[7] 64	84
East South Central	88	104	110	112	81	60	110	104	133	119
West South Central	88	66	130	66	84	90	107	62	69	82
Mountain	120	139	77	113	129	61	[8] 88	113	[8] 132	78
Pacific	43	82	64	63	40	69	71	60	74	104

[2] Barre, Vt., Omaha, Nebr., Winston-Salem, N. C., and Reno, Nev., not included.
[3] Kansas City, Mo., Winston-Salem, N. C., and Reno, Nev., not included.
[4] Barre, Vt., not included.
[5] Omaha, Nebr., not included.
[6] Kansas City, Mo., not included.
[7] Winston-Salem, N. C., not included.
[8] Reno, Nev., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended June 14, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended June 14, 1930, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia			1			
New Brunswick [1]						
Quebec	1					7
Ontario	1		2		10	9
Manitoba [1]						
Saskatchewan					12	3
Alberta				1		
British Columbia		4			1	2
Total	2	4	3	1	23	21

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended June 21, 1930.—The Bureau of Health reports cases of certain communicable diseases in the Province of Quebec, Canada, for the week ended June 21, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	53
Chicken pox	84	Poliomyelitis	1
Diphtheria	27	Scarlet fever	64
Erysipelas	3	Smallpox	2
German measles	31	Tuberculosis	54
Influenza	3	Typhoid fever	9
Measles	90	Whooping cough	14

CHINA

Meningitis.—During the two weeks ended June 14, 1930, 6 cases of meningitis, with 3 deaths, were reported in Canton, China.

YUGOSLAVIA

Communicable diseases—May, 1930.—During the month of May, 1930, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	36	2	Puerperal sepsis	2	1
Cerebrospinal meningitis	11	7	Rabies	3	3
Diphtheria and croup	338	54	Scarlet fever	1,033	150
Dysentery	19	2	Tetanus	32	20
Glanders	1	1	Typhoid fever	202	24
Leprosy		1	Typhus fever	16	1
Measles	2,041	31			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service. American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930			May, 1930					June, 1930			
						12	19	26	3	10	17	24	31	7	14	21	28
China:																	
Canton	C										1	1	1		2		
Manchuria—Dairen	C			1													
Swatow	C												3		3		
India	C	12,350	6,461	5,914	10,817		7,436	15,870									
	D	6,507	3,606	3,371	5,866		4,345	10,403									
Bassein	C					3	1	1	2	3	4						
	D					2	1	1	1	3	2						
Bombay	C				4												
Calcutta	C	138	202	269	354	137	165	165	180	194	175	142	98				
	D	90	110	153	220	85	118	118	93	125	107	83	57				
Negapatam	C	1	12												1		
	D	1	4												1		
Rangoon	C	6	3	3	2				1		5	2	2	1			
	D	5	3	1	2				1		1		2	1			
Tuticorin	C	35	3														
	D	9	1														
India (French):																	
Chandernagor	C	1		4	1	1	2		3	2	2	2					
	D	1		2	3			4	1	1	4	1					
Karikal	C	1		4	12		1										
	D			1	9		1										
Indo-China (see also table below):																	
Pnompenh	C	3	11	9				2		1				5	10		
	D	3	8	7	6						2	2	1	1	4		
Saigon and Cholon	C	1	2	5	14	17	12	19	28	59	40	48	13	17	19		
	D	1	2	4	6	10	10	13	22	43	27	24	7	11	10		
Philippine Islands:																	
Bulacan Province—																	
Malolos	C													1			1
	D													1			
Santa Maria	C																1
Cebu—																	
Bantayan	C													3	8	53	86
	D													3	7	28	43

Barili	C																1
Bogo	C														1	3	1
	D														1	1	1
Cebu	C																1
Madridejos	C																15
	D																8
Medillin	C																1
Santa Fe	C													1			
	D													1			
Iloilo—Miagao	C																1
Leyte Province—Maripipi	C														1	15	20
	D															11	9
Masbate—Cataingau	C																10
	D																3
Manila	C											1					
Negros—																	
Bacolod	C															9	
	D															8	
Cadiz District	C												10	2	10		3
	D												7	1	5		3
Escalante	C													1			
	D													1			
Hays Calatrava	C															3	
	D															2	
La Carlota	C																3
	D																1
La Castellana	C																4
	D																2
San Remigio	C															3	8
	D															2	4
Talisay	C															7	4
	D															7	1
Pampanga Province—																	
Angeles	C															1	
Bacolor	C																1
Rizal—Navotas	C												1				
	D												1				
San Antonio	C														1		
	D														1		
Siam	C	11	3	7	1	8	7	3		12	4	6			1	1	
	D	2		4		6	3	2		10	2	2			1		
Bangkok	C	9	3	2	2	1	5	4	5			6	3	5			
	D	1			1	1	2	1				2	1				
Nagara Pathom	C			1				4	6								
	D			1				2									
On vessel:																	
S. S. at Suva. Fiji Islands	C			1													
S. S. Sutley, at Batavia, from Calcutta	C			1													
S. S. Sassari, at Massoua, from Jeddah	C												1				
	D												1				
On small boat at Port Cebu, from Bantayan Island	C													1			
	D													1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		December, 1929	January, 1930	February, 1930			March, 1930			April, 1930			May, 1930		
				1-10	11-20	21-28	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (French) (see also table above):															
Annam [1]	C	--	1	2	2	--	--	52	--	--	--	60	--	20	3
Cambodia [1]	C	41	147	41	3	46	49	32	--	18	6	--	5	31	52
Cochin-China [1]	C	46	177	64	39	21	5	22	55	48	--	--	188	224	259

[1] Reports incomplete.

PLAGUE

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930			May, 1930					June, 1930			
						12	19	26	3	10	17	24	31	7	14	21	28
Argentina:																	
Andalgala. [1]																	
Rosario	C	--	P	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sante Fe	C	--	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Villa Lia	D	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	--
Azores: Ponta Delgada	C	9	--	--	--	--	1	7	--	--	--	--	--	--	--	--	--
	D	5	--	--	--	--	--	5	--	--	--	--	--	--	--	--	--
Brazil:																	
Rio de Janeiro	C	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	D	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sao Paulo [2].																	
British East Africa (see also table below):																	
Tanganyika	C	--	--	7	--	--	11	33	--	--	--	--	--	--	--	--	--
	D	--	--	--	--	--	10	10	--	--	--	--	--	--	--	--	--
Uganda	C	127	82	47	98	27	20	23	47	54	--	--	--	--	--	--	--
	D	112	70	43	87	27	19	21	38	48	--	--	--	--	--	--	--

Ceylon:																	
Colombo	C	2	4	3	4			1		4	1		1	1			
	D	1	4	3	4			1		3	1		1	1			
Plague-infected rats			1	3	2	2			2					1			
Chile: Antofagasta	C		1	1	1				1								
	D				2				1								
Dutch East Indies:																	
Batavia and West Java	C	286	167	153	124	27	16	20	24								
	D	280	164	150	122	27	16	20	24								
Plague-infected rats			3	3	3		6	2				3	2	3			
Celebes—Makassar	C		1														
	D		1														
Plague-infected rodents		4															
East Java and Madura	C	2															
	D	2															
Java and Madura	D	458	317	296	223	59	40	35	48	28							
Ecuador (see table below).																	
Egypt:																	
Alexandria	C	2	4	1	4			1	1	2	3	3	5	3	6	6	4
	D	3	1		1			1	1			1	2			2	5
Assiout	C	4						7	7	3	9	2	6	4	2	3	
	D	2						3	2		3	1	1		1		2
Assuan	C	2															
Beheira	C		2		4												
Beni Suef	C				4												
Dakahlieh	C	1		8	5	2		1	2	3	1	2	5	1			
	D	1			1						1	1					
Gharbieh	C	2	1					1									
	D	1						1									
Girga	C					1											
Minieh	C											6	1	1	1	4	4
	D												1		1		
Port Said	C					1					1	1		1			1
Greece (see also table below):																	
Patras	C				1											1	
Piraeus	C		1														
Pyrgos	C				1												
India	C	4,713	4,814	5,639	4,087		343	535									
	D	3,093	3,308	3,940	3,344		229	517									
Bassein	C		1		3												
	D		1		1												
Bombay	C		1	1	7		4			4	1		1	1			
	D		1	1	5	1	3	4		1	4						
Plague-infected rats		29	28	31	86	20	28	25	35	23	39		19	6			
Madras Presidency	C	336	27	230	157	12	15	9	8								
	D	174	13	140	87	6	8	4	1								
Rangoon	C	3	3	7	3		3		2		1	3					
	D	4	2	6	3		2	1	1	1	1	1					
Plague-infected rats			1	7	3	1	2		1	1	3	1					
India (Portuguese)	D									7							

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.
[2] 21 cases of plague with 8 deaths were reported Jan. 29, 1930, in the State of Sao Paulo, Brazil; 15 of these cases were in the city of Sao Paulo.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930 12	19	26	May, 1930 3	10	17	24	31	June, 1930 7	14	21	28
Indo-China (see also table below):																	
Pnompenh	C		1			2			1	1			2	6			
	D		2	13	13	2	1	1				1		5	1		
Saigon and Cholon	C	1	2		1					1				1			
	D	1	2		1												
Iraq:																	
Baghdad	C	2	6	6	7		2		4	7	11	7	12	12		8	4
	D	1	2	1	4				2	3	5	4	6	7		5	
Basra	C	1															
Naudham	C	1															
Japan: Osaka (vicinity of)—Plague-infected rats		1	7	6	4	1	1	1									
Kwang-Chow-Wan	C		25	25	7				37		20		14				
Madagascar (see also table below):																	
Tamatave	C	4					1										
	D	3															
Morocco	C	12	4	48	55	14	41	34	32	19	22	18	12	2			
	D			13	18	6	26	12	11	11	14	6	3	4			
Nigeria: Lagos	C	15	6	7	13					1	1			1			
	D	15	6	7	5					1	1			1			
Plague-infected rats		18	44	42	25	3	3	1		2							
Senegal (see table below).																	
Siam	C	11	8	17	16	4		1									
	D	9	6	13	15	4		2									
Bangkok	C	1		1	5						1	1	3				
	D	1		1	4						1		3				
Nagara Pathom	C	6	7	5	1		3	2	1								
	D	5	7	6	1	4	3	1	1								
Nagara Rajsima	C	2	2	2	1		1										
	D	1			1		1										
Syria: Beirut	C														2	1	1
Tunisia:																	
Sfax district	C	14	18	22				1		17			4	6			
Tunis	C	42	6	5	1				4						1		
	D	21												1			

Union of Socialist Soviet Republics:																
Kazaks	C	P														
Salsk Region	C													1		
	D													1		
Stavropol Region	C													1		
	D													1		
Union of South Africa:																
Cape Province	C		1	2	1						P					
	D	7		1	1											
Orange Free State	C	5	15	11	5	1										
	D	1	9	3	3											
Transvaal	C		8	2	1											
	D		3		1											
On vessel:																
At Rio de Janeiro, Brazil, from Argentina	C		1													

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
British East Africa (see also table above):							
Kenya	C	54	34				
Uganda	C	216	184	109			
	D	199	155	99			
Ecuador: Guayaquil	C	17	4	2	2	0	
	D	6	2	2		0	
Plague-infected rats		13	4	2	2	0	
Ecuador (outside of Quayaquil)	C	19	4				
	D	5	2				
Greece (see also table above)	C	1				1	
Indo-China (see also table above)	C	10	10	30	27	4	
Madagascar (see also table above)	C	264	282				
	D	248	258				
Ambositra Province	C	111	128	49	25		
	D	96	111	41	20		
Antisirabe Province	C	16	26	22	38		
	D	16	25	22	36		
Itasy Province	C	19	31		4		
	D	16	31		4		

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
Madagascar—Continued.							
Miarinarivo Province	C	3		25	14		
	D	3		25	14		
Moramanga Province	C	12	22	7	5		
	D	12	21	4	5		
Tamatave Province	C	2	3				
	D	2	1				
Tananarive Province	C	97	88	110	52		
	D	98	83	107	52		
Senegal:							
Baol [1]	C	5			18	24	13
	D	2			8	12	11
Dakar [1]	C	8				2	52
	D	1				2	42
Louga [1]	C			2		33	54
	D					10	27
Thies [1]	C		3		3	12	21
	D				2	9	8
Tivaouane [1]	C		1		11	71	135
	D				8	38	69

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930			May, 1930					June, 1930			
						12	19	26	3	10	17	24	31	7	14	21	28
Algeria:																	
Algiers	C		6	1	5	1					1		2				
Constantine	C		1														
Oran	C		5		1												
Arabia: Aden	C	1	1	2	3			1									
Bolivia: La Paz.[1]																	
Brazil: Rio de Janeiro	C	1															
British Borneo: Sarawak	C		4	19													
British East Africa (see also table below):																	
Tanganyika	C	27	5	49	103			26	31	33							
	D	5		8	7			10	4	3							
British South Africa:																	
Northern Rhodesia	C				9				1								
	D								2								
Southern Rhodesia	C	33	1	6				66		53		42					
	D	6						1		4		8					
Canada:																	
Alberta	C	16	22	4	10	3	1										
Edmonton	C	15	19	1	4	3											
British Columbia—Vancouver	C	17	16	16	20	8	1	5	3			2	2	1	1		
Manitoba	C	8	6	2	4	2			2			7	3				
Ontario	C	51	63	86	100	17	30	18	12	14	24	24	20	14	10		
Fort William	C		4														
North Bay	C		2	1						1							
Ottawa	C	7	10	11	19	8	4	7	2	3	10	7	5	6		8	
Toronto	C		2									3	1	2	1	1	
Quebec	C	3	11														
Montreal	C		1														
Saskatchewan	C	61	86	76	47	3	10	7	21	20	6	10	3		12		
Regina	C	31								1		3					
Ceylon:																	
Angoda, Western Province	C			10					6								
	D			1					2								
Colombo	C	1	1	3													
	D			2													

China:																	
Canton	C	5	7	11	6		2	1						1			
	D		2	3	2	1	1		1								
Chungking	C	P	P	P		P	P	P	P	P							
Foochow	C	P	P	P			P		P								
Hong Kong	C	102	118	62	38	20	7		1	5	5	2		2	1		
	D	73	109	51	25	11	9	3		4	2	3		1			
Manchuria—																	
Harbin	C	1	3				1										
Kwantung—Dairen	C	1	6	5			1			1		7			11		
Nanking	C	P	P	P	P	P			P	P			P				
Shanghai—																	
Foreigners only	C	7	5	2	2	2	1				1	1			1		
Including natives	D	6	8	7	10	4	3	2	1		1	2	2	1			
Swatow	D	2	3	6	6	2			1	1		1	4	1			
Tientsin	C	2	1	1	2	1			1	1							
Chosen (see table below).																	
Colombia:																	
Baranquilla	C	1		102	2	1											
Buenaventura	C	13		1		7	5	2	1	2		1	1	1			
Costa Rica:																	
Port Limon	C					1	1	2	2				2	2			
San Jose [2]	C				10	7											
Curacao (alastrim)	C				14			1	1	2							
Dahomey (see table below).																	
Dutch East Indies:																	
Belawan Deli	C	1															
Borneo	C		1		185	17	43	20	10								
	D		1		12	16	12	2	1								
Java—																	
Batavia and West Java	C	17	14	14	78	30	25	8	1	1		5	1				
	D	10	7	7	6	6	1	3	1	1			2				
East Java and Madura	C							4									
Sanggi Islands	C	17	25	12	5		43		66								
	D	3			1		2		13	1							
Sumatra	C	1	2		48												
	D				5												
Egypt: Port Said	C		2			1					1						
Great Britain:																	
England and Wales	C	1,005	1,455	1,530	1,700	423	345	353	306	462	324	304	327	237			
Ashton under Lyne	C	3	4	29	15	9	3	4	2	6	3	4	4				
Bradford	C	8	5	2		1			2		1		1				
Cardiff	C				2	1	2										
Leeds	C		6	11	16	1	1										
London	C	480	597	699	710	169	169	129	137	222	138	148	129	130			
London and Great Towns	C	799	1,101	1,156	1,239	308	264	265	229	339	250	235	254	197			
	D		2	5	3	2	1	1									
Sheffield	C				8	1	1										
Stoke-on-Trent	C	12	12	41	122	17	23	33	12	19	9	13	21	3			
Greece: Patras	C	1															

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended—											
						April, 1930			May, 1930					June, 1930			
						12	19	26	3	10	17	24	31	7	14	21	28
Hedjaz	C	11	11														
India	C	12,789	26,524	36,036	39,329		7,786	8,385									
	D	3,730	6,186	7,710	9,109		1,543	1,779									
Bombay	C	119	342	638	718	143	114	89	84	52	68	58	40	36			
	D	57	164	314	431	88	78	64	44	33	49	44	35	27			
Calcutta	C	88	185	399	361	153	116	122		109	70	52	71	56			
	D	62	130	287	305	124	97	103		94	72	40	52	50			
Cochin	C	234	234	184	291	56	49	58	20	13	8	7	9	4			
	D	20	27	29	35	3	4	6	2	5	1	2		2			
Karachi	C	17	30	38	33	10	9	7	4		6	7	1	5			
	D	11	9	16	47	10	3	2	2	2		1	1	2			
Madras	C	85	105	159	173	55	26	27	25	24	13	15	20	9			
	D	16	16	29	36	6	6	5	10	4	5	6		6			
Moulmein	C	18	65	143	146	10		33		27	29	20	13				
	D	9	18	40	41	4		3		4	6	5	6				
Negapatam	C			1								1					
Rangoon	C	2	7	7	10		1	1	2	2		3	1	1			
	D		4	2	5					1							
Tuticorin	C		3									5					
Vizagapatam	C	2	5	9	69	1		2	3	3	1	1					
	D			1	18	1			1		3						
India (French):																	
Chandernagor	C		3	11	6	4		6		6	2	8	8				
	D			5	2			2		2	4	1					
Karikal	C		3	12	24	8	9	2		6	5	1					
	D		3	8	7	3	3	2		2	1						
Pondicherry Province	C	20	22	52	21	12	1	11		9	13	10	8				
	D	19	19	40	13	11	1	8		7	12	10	7				
India (Portuguese)	C		16	50	38	5	6	15	17	2							
	D			6	2			5	3								
Indo-China (see also table below):																	
Pnompenh	C									1		1	1				
	D		1				1	1						1			
Saigon and Cholon	C	4	3	4	3			4	1	1	1			1			
	D	2	3	2	1		1	3	1		1		1				

Iraq:																	
Baghdad	C	16	7	3		1	2	3	2	1				1			
	D	5	3	1					1	1							
Basra	C			1					1								
Mossoul Liwa	C	80	26	12			22			13		8			1		
	D	3	7	2			3			2		1			1		
Ivory Coast (see table below):																	
Jamaica	C												2				
Japan: Tokyo	C								1								
	D								1								
Macao	D			2	3	1			1	1							
Mexico (see also table below):																	
Jalisco (State): Guadalajara	D	9	9	14	22	6	4	8	2			6	1	4		5	
Juarez	C	3	2	3	2												
	D	2	1	1													
Mexico City and surrounding territory [3]	C	25	30	38	106	36	19	20	21	30	15	17	18				
	D	4	7	21	31	11	8	14	11	6	12	8	6				
Morelos State [4]																	
Progreso	C											1					
	D											1				1	
San Luis Potosi	C			1													
	D			1													
Morocco (see table below).																	
Netherlands: Rotterdam	C	1															
Nigeria (see also table below): Lagos	C	2	5	2	1	1											
	D	1	2														
Persia (see table below).																	
Philippine Islands: Sarangani and Balut Islands [5]	D	40	18	3													
Poland	C	2		2				2	5		1		2				
Portugal: Lisbon	C	6	4	7	7	2	3	3		6		2		1			
Rumania	C		1	1	2												
Siam	C	42		2		2	2	2	2	2							
	D	9	1				2	2									
Somaliland, British: Boales	C	5	35	19	2												
	D	9	8	2	6												
Straits Settlements	C		2		5	2	1		2	1	3	2	5	5			
	D		1		1	1			1		1	1	1	1			
Sudan (Anglo-Egyptian)	C	290	230	79	60	2	9	31			5	13	1	4	8	1	54
	D	65	34	6	5	1		3				1	1				3
Sudan (French) (see table below).																	
Syria (see table below).																	
Tunisia: Tunis	C	20	7	3	3			1	3		1		1				
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P	P		P		P	P						
Orange Free State	C	P	P	P	P												
Transvaal	C	P	P	P	P												
Upper Volta	C			26	2	2		1					1				
Zanzibar	C				13												

[3] During the month of March, 1930, 100 cases of smallpox were reported in Mexico City, Mexico, and surrounding territory.
[4] Newspaper reports of Feb. 4 show an epidemic of smallpox in Ionacatepec, Morelos State, Mexico, and vicinity giving 600 deaths in preceding 2 weeks.
[5] On Feb. 1, 1930, 317 cases of smallpox with 102 deaths were reported to that date in the Sarangani and Balut Islands.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	April, 1930: 19	April, 1930: 26	May, 1930: 3	May, 1930: 10	May, 1930: 17	May, 1930: 24	May, 1930: 31	June, 1930: 7	June, 1930: 14	June, 1930: 21	June, 1930: 28
On vessel:																	
S. S. Tairoa, at Liverpool, from London	C			1													
S. S. Karagola, at Zanzibar, from India	C		4														
S. S. Karagola, at Lourenco Marques, from India	C			1													
S. S. Elysia, at Port Sudan, from Bombay	C						1										
S. S. Naldera, at Port Said	C									1							

Place		December, 1929	January, 1930	February, 1930	March, 1930: 1–10	March, 1930: 11–20	March, 1930: 21–31	April, 1930: 1–10	April, 1930: 11–20	April, 1930: 21–30	May, 1930: 1–10	May, 1930: 11–20	May, 1930: 21–31
Belgian Congo	C	74											
	D	4											
Dahomey	C	19											
Indo-China (see also table above)	C	142	460	434			26	261				173	132
Ivory Coast	C					7							
Sudan (French)	C	17	229	213		200	409	371		150	40	56	178
	D		25	11		18	31	30		6	7	7	18
Syria: Beirut	C	25	70	18	4	8	5	10	2	7			
Taiwan: Taihoku	C			43	31	12	15	10	2				

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
British East Africa (see also table above):							
Kenya	C	168	12	12	175	174	
Chosen	C		1	4		5	
Mexico: Durango (see also table above)	D	4	12	6	5	4	4
Morocco	C	84	29	74		10	18
Nigeria	C	293					
	D	70					
Persia	C	P					
Turkey	C	883	215	114		3	16
	D	457	66	42			

TYPHUS FEVER

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Week ended— March, 1930: 15	22	29	April, 1930: 5	12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21
Algeria:																			
Algiers	C	14	3	4	2	1		3	2	3	2	1	1	2	4	8	2		
Constantine Department	C	2	4	5	2	3		6	4	9	2			4		2	11		
Oran	C		2													3			
Arabia: Aden	C				1														
	D				1														
Bolivia: La Paz.[1]	C	1		2									1						
Brazil: Porto Alegre	C	41		13	9				15				1		5		1		
Bulgaria	D	2		1					1				1				1		
Sofia	C		1																
Chile:																			
Talcahuano	D		1																
Valparaiso	C		1																
China:																			
Manchuria—Harbin	C			1				4	5		20	27							
Shanghai	C				1														
Tientsin	C	1	1																

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia ,from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Week ended— March, 1930 15	22	29	April, 1930 5	12	19	26	May, 1930 3	10	17	24	31	June, 1930 7	14	21
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C										1								1
Assuan	C	9																	
	D	1																	
Beheira Province	C	7	14	18			2				2		9	21	9	10	17	16	
	D			5									4	4	4	1	1	1	
Cairo	C			1															
Dakahlieh	C	11																	
	D	2																	
Port Said	C		2	1															
Suez	C		1																
Great Britain: Scotland—Glasgow	C													1					
	D													1					
Greece (see table below).																			
Iraq: Baghdad Liwa	C	1						2											
	D	1																	
Ireland:																			
Irish Free State	C	1																	
Ballina—Mayo County	C															2		1	
Dingle—Kerry County	C										3	2							
Shillelagh—Wicklow County	C																	1	
Swinford—Mayo County	C													7	7				
Northern Ireland—Cookstown	C			3															
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico: Mexico City, including municipalities in Federal District	C	6	12	9		2	1	1	2	1		1		2		4			
	D	2	4				1		2	1		1				3			
Morocco	C	6	23	21	4	7	14	13	6	5	3	1	3	6	1	1	1		
	D						4	3	2	1									
Palestine	C			1	1	1	2	2		1				2			2		

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THE PREVALENCE AND TREND OF MENINGOCOCCUS MENINGITIS IN THE UNITED STATES[1]

By R. C. Williams, *Assistant Surgeon General, United States Public Health Service*

The reports received by the United States Public Health Service from State health officers for the past five years indicate that there has been a progressive increase in the number of cases of meningococcus meningitis that have been recorded. It is true that the actual number of cases is not large when compared with the total population. It is significant, however, that each year there has been an increase over the preceding year and that this rise has continued for five years.

When the prevalence of meningococcus meningitis increased during the period 1915 to 1917, the number of cases rose in Europe before the movement occurred in the United States; but after the World War the number of cases did not rise noticeably in Europe until 1929, and then the increase was not general and the rates were not high.

Incomplete reports for the first three months of 1930 show rates higher than the normal for England and Wales, Scotland, The Netherlands, and Poland, but no figures from Europe have been found indicating a general increase in the prevalence of this disease comparable with that in the United States.

There was an outbreak of meningococcus meningitis early this year in the Anglo-Egyptian Sudan, and reports from the French Protectorate of Morocco show some increase in cases in March. Recent reports from Asia do not show anything unusual in the prevalence of the disease. Canada has reported comparatively few cases, but there has been a slight increase in incidence in Mexico.

The nomenclature relative to meningococcus meningitis has been changed several times, the disease having been variously designated cerebrospinal meningitis, epidemic meningitis, and other similar terms. For this reason earlier figures are not exactly comparable with the later ones.

The death rates from meningococcus meningitis in the registration area of the United States increased gradually from 0.4 per 100,000

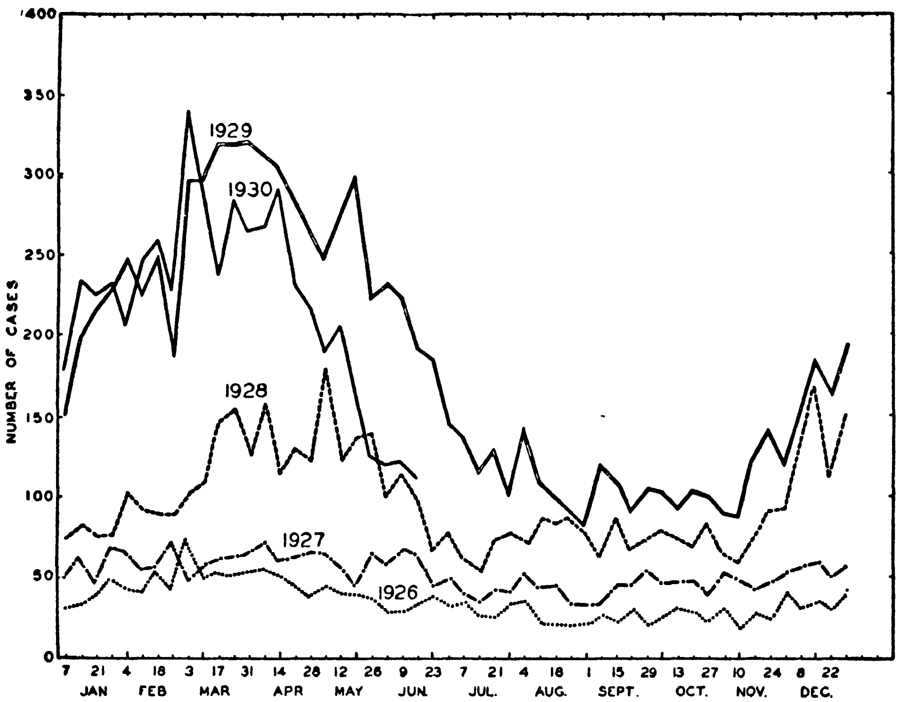
[1] Presented at the Twenty-eighth Annual Conference of State and Territorial Health Officers with the United States Public Health Service, Washington, D. C., June 19, 1930 (held jointly with the Forty-fifth Annual Conference of State and Provincial Health Authorities of North America).

population in 1910 to 3.9 in 1917. Then the rate decreased to 1.0 per 100,000 in 1922, remained stationary at 1.0 to 1.1 until 1926, when it rose to 1.3. In 1927, it was 1.6, and in 1928, 2.6 per 100,000.

The rise in incidence of meningococcus meningitis during the past five years has been accompanied by sharp local outbreaks in various sections of the country. In most of these outbreaks the death rate has been relatively high.

Although there have been considerable differences in various parts of the country in the incidence of meningococcus meningitis, and also wide fluctuations in the numbers of cases reported in the same States

MENINGOCOCCUS MENINGITIS



Graphical representation of the number of cases of meningococcus meningitis reported weekly by State health officers to the United States Public Health Service for the years 1926 to 1930

at different times, yet the increase in the prevalence of the disease since 1925 has extended to all sections of the country.

In 1925, the States reporting the highest case rates were Utah, with 11 cases per 100,000 population; Oregon, 10 cases; Nevada, 8 cases, and Wyoming and Washington, each with 4 cases per 100,000.

In 1926, the highest case rates were in Washington, 16 per 100,000; Idaho, 14; Oregon, 11; Montana, 6; California, Nevada, and Wyoming, each with 5 cases per 100,000.

In 1927, the highest case rates for the disease were as follows: Montana, 23 per 100,000; Washington, 13; Wyoming, 12; Wisconsin,

11; Oregon, 10, Idaho, 9; California, Minnesota, Nevada, and North Dakota, 6 per 100,000.

In 1928, Wyoming reported 34 cases per 100,000 population; Montana, 32; Nevada, 22; Colorado, 21; Idaho, 18; North Dakota and Arizona, 16; New York, 11 (New York City had a case rate of 18); and Washington and Missouri, 9 per 100,000.

Reports are not yet complete for 1929. The Mountain States show case rates from 18 to 59 per 100,000 and the Pacific States from 7 to 19. Michigan reported 40 cases per 100,000; North Dakota, 21; Missouri, 18; and New York, 10. New York City had a case rate of about 16 per 100,000 in 1929.

For the United States as a whole during the first two months of the year 1930 more cases of meningococcus meningitis were reported than were reported for the same period of 1929, but early in March the graph representing the 1930 incidence fell below the graph for last year, although it is still above the incidence for any other recent year.

During the first 22 weeks of 1930, 5,400 cases of meningococcus meningitis were reported to the Public Health Service by 47 States. For the same period of 1929, 5,900 cases were reported, but in 1928 the same States reported only 2,600 cases for the 22 weeks.

In general, the States which reported considerable numbers of cases of meningococcus meningitis during the first five months of last year show decreased prevalence this year, but some States which in prior years have had comparatively few cases, report decided increases in the prevalence of the disease this year.

For the first 22 weeks of 1930, the Pacific States reported 327 cases of meningococcus meningitis, as compared with 667 cases for the corresponding period in 1929. Seven of the Mountain States reported 456 cases this year (for 22 weeks) and 776 cases last year.

Illinois reported 273 cases for the 22 weeks this year and 342 cases last year; Michigan 643 cases this year, 1,085 last year; North Dakota 59 cases and 93 cases, respectively. For Missouri the figures are 305 and 428 cases; New York State, 402 cases in 1930 and 721 in 1929.

The following are some of the States which reported an increase during the first 22 weeks of 1930 over the same period of 1929: Massachusetts, 114 cases this year, 81 cases last year; Indiana, 346 cases this year and only 7 last year. In Indiana the number of cases reported increased suddenly in December, 1929, many of the cases being in Indianapolis.

Tennessee reported 389 cases of meningococcus meningitis for the 22 weeks this year and 37 cases last year; Mississippi, 254 cases as compared with 15 cases last year; and Kentucky, 54 cases this year as compared with 15 in 1929.

The total number of cases of meningococcus meningitis reported throughout the United States for the past five years is as follows:

Year	Cases	Year	Cases
1925	1,859	1928	5,781
1926	2,226	1929	9,660
1927	3,204		

In considering these figures the difficulties of obtaining accurate reports should be borne in mind.

From the standpoint of the public health officer, the control of meningococcus meningitis is an extremely difficult problem. Studies conducted in various sections of the country have failed to produce any new methods of importance. Dr. Sara E. Branham, a worker of the Public Health Service, has recently reported a new meningococcus-like organism (*Neisseria flavescens* n. sp.) from cases of epidemic meningitis (Public Health Reports, April 18, 1930).

Apparently the most important measures to be considered in connection with the control and prevention of meningococcus meningitis are: (1) Prompt recognition of cases of the disease; (2) prompt reporting to the health authorities; (3) avoidance of overcrowding; (4) maintenance of high standards of bodily vigor; (5) sterilization of dishes and eating utensils; (6) optimum of fresh air and sunshine for carriers and convalescents.

RECENT PROGRESS IN STUDIES OF UNDULANT FEVER [1]

By H. E. Hasseltine, *Surgeon, United States Public Health Service*

During the year elapsed since the last meeting of this conference the Public Health Service has continued field investigations of undulant fever along two lines: (1) A reasonably complete epidemiologic investigation in the State of Iowa by Acting Assistant Surgeon A. V. Hardy, in conjunction with the Iowa State Department of Health and the University of Iowa; and (2) a general survey of the disease in various States, with investigations of sufficient individual cases to indicate the various methods of transmission of the disease. This survey has been carried out largely by myself, with excellent cooperation from all State and local health authorities.

Doctor Hardy has studied approximtely 200 cases occurring in Iowa in 1929, which, with those he had previously investigated, makes his total about 375 cases. I have investigated 109 cases in 14 different

[1] Presented at the Forty-fifth Annual Conference of State and Provincial Health Authorities of North America, Washington, D. C., June 18, 1930 (held jointly with the Twenty-eighth Annual Conference of State and Territorial Health Officers with the United States Public Health Service).

States, some of which are chiefly agricultural States and others that are largely made up of urban communities.

Hardy has collected epidemiologic data on 333 cases and I have done the same on 109 cases. These 442 cases can be divided into 3 main groups: (*a*) Those without significant exposure to livestock or carcasses (mostly urban cases); (*b*) rural cases having direct contact with livestock; and (*c*) urban cases having direct contact with livestock or carcasses.

These may be referred to as the milk, farm, and meat groups.

Group I, the milk group, had 198 cases (103 males, 95 females).

Group II, the farm group, had 200 cases (191 males, 9 females).

Group III, the meat group, had 44 cases (43 males, 1 female).

Age.—Thirteen cases were in children under 10 years of age; all in this age group had no contact with livestock. The decade from 35 to 44 had the greatest number of cases, 118; the age groups between 20 and 50 furnished 296 cases (67 per cent).

Prevalence.—In 1929 the disease was recognized in every State of the Union. Simpson collected a total of 1,305 cases in the United States. An inquiry by means of a questionnaire as to the number of officially reported cases disclosed that 968 were so reported. Accepting these figures it appears that at least 25 per cent of the recognized cases are not reported, while the number that is not recognized can not be estimated with any degree of certainty. The year 1929 is the first year to show anything like a seasonal distribution, the number of reported cases increasing up to September, after which there was a rather sharp drop. Whether this will prove to be the true seasonal variation or not will require several years to establish. It corresponds roughly with the seasonal curve of Malta fever reported by the Royal military and naval authorities.

In the course of this work I have frequently been asked numerous pertinent questions and I believe that these can best be presented in interrogatory form, with such information as I may be able to give in reply.

Is there any evidence that Bangs' bacillus causes undulant fever?

By Bangs' bacillus is meant the so-called bovine strains of *Br. melitensis*, variety *abortus*, or, using the name proposed by Huddleson, *Br. abortus*. This question is frequently raised by a group that claim that undulant fever has not been caused by use of cow's milk. Hardy reports that cultural studies in his Iowa cases have yielded 49 strains of *Brucella* from 48 patients. Thirty-five of these have been determined to be the porcine variety and 14 have proved to be the bovine strain. From one patient both porcine and bovine strains were isolated. Admitting that these figures represent the true incidence of the organisms, we still have 30 per cent of our culturally proved undulant fever in Iowa due to the bovine organism. Those who have tried the

isolation of *Brucella* from the blood stream agree that it is far more difficult to grow the bovine organism than the porcine or the caprine strains.

Hardy's investigations of the clinical aspect of cases in Iowa also show that those yielding porcine strains suffered more severely than those yielding bovine strains. This observation has also been suggested in my own work though in only a few instances have successful cultures been made.

A case of undulant fever occurred in the wife of a professional man of this city who lived in Maryland just outside the District. Though the case had recovered at the time my investigation was made, the epidemologic evidence pointed to the family cow as the source. The cow's blood had been tested by the veterinary department of the University of Maryland and found to react positively to the *abortus* agglutination test. By chance I happened to mention this case to Dr. W. E. Cotton, of the agricultural experiment station at Bethesda, Md., and as a result the cow was purchased by the experiment station. Subsequent cultural studies yielded an organism of the bovine strain from all four quarters of the cow's udder. The cow and her calf both appeared normal, no indication of any disease being discernible. The patient drank very little milk, but used cream freely and made butter from the excess cream. It is possible that she may have received the infection through the skin, but, nevertheless, it was a case due to infected dairy products. If an organism can enter through the skin, it can probably enter through a mucous membrane also.

It has been found that dropping *Brucella* organisms into the conjunctival sac of animals gives rise to infection as readily as by feeding the cultures.

In connection with the question of pathogenicity of the bovine organism it should be pointed out that there is good evidence that cows become infected with porcine or caprine strains and may transmit these organisms through the milk. In Waycross, Ga., I found that in eight out of nine investigated cases occurring in 1929 the patients had used raw milk from one dairy. From two of these an organism corresponding to the porcine strain was isolated. Neither of these cases had any contact with livestock. All nine cases showed a marked resemblance clinically, and probably all would have yielded the porcine strain if cultural studies had been made on them. The evidence obtained was quite suggestive, if not convincing, that cows had become infected with the porcine organism and they in turn passed the infection along in their milk.

There is also very suggestive evidence that the caprine strain of the organism may be present in cattle of the Northern States.

To us as health officials it makes no difference whether a patient receives a bovine, porcine, or caprine type of *Brucella* through the raw milk he consumes; the fact that he contracts a preventable disease through such channels is what makes the matter of first importance to us.

Is pasteurization of milk effective in protecting against Brucella infection?

In the January issue of the Health Messenger of the Illinois State Board of Health, it was reported that Arnold had found that 140° F. for 40 minutes was required to kill certain strains of *Br. abortus.* He did not give details, and it will be noted that the temperature he employed is 2 to 3 degrees below standard pasteurization temperature. On the other side numerous investigators have reported pasteurization temperature and exposure effective in killing the various strains of *Brucella.* On the practical side, how many of you State health officers have received reports of undulant fever in the cities of your respective States that have approximately all of their milk supply pasteurized? Though I have made no personal investigations of individual cases in California, Oregon, and Ohio, I have had full access to the records in their health departments and in those States the majority of cases are traced to raw milk. In cities having only a portion of their milk supply pasteurized, undulant fever has picked out the user of raw milk with as much precision as smallpox picks out the unvaccinated.

Two cities, Frederick, Md., and Waycross, Ga., have passed ordinances requiring pasteurization of all milk sold within their limits, undulant fever being the chief, if not the only, factor in bringing about this action. Waycross had only about one-half of its milk pasteurized when undulant fever was first recognized, yet the disease did not develop in those using pasteurized milk exclusively. After nearly two years of observation of these groups, each of which formed a valid control for the other, the health officer had little trouble in convincing city authorities that pasteurization of all milk was necessary to protect the health of the city.

Can undulant fever be contracted by any means of transmission other than milk?

The answer to this is an emphatic affirmative: Contact with infected animals, particularly infected hogs, may and frequently does, result in infection. Usually these cases are severe and sometimes fatal.

Let me cite one case where the contact with hogs seems to be the only explanation. An Italian patient was taken sick about April 1, 1929, and was in hospital until the latter part of August. He worked on a hog-feeding farm near a large eastern city where over 10,000 hogs were maintained on garbage. The establishment maintained about

2,500 brood sows. The patient lived at the hog farm, subsisting in a common mess with other employees, mostly Italians. He had used no fresh milk of any kind for over a year, canned milk being used on their table. The manager of the farm was not aware that hogs suffered from infectious abortion, but on further questioning it developed that some brood sows had been imported from Iowa in the fall of 1928 in order to introduce new breeding blood. Some of these sows aborted or farrowed small and weak pigs. Just how the patient received his infection is not known, but the fact that he worked daily around hogs and used no fresh dairy products seems to warrant considering this a case of infection resulting from contact with hogs. In addition, a culture of the porcine type was isolated from the patient.

Several cases in Kansas City, Kans., which I investigated, were found to use pasteurized milk but worked in a packing plant, most of them working on hog carcasses only.

Is the blood agglutination test reliable?

This question is bound to come up in any scientific group that discusses undulant fever. Instances of conflicting reports on specimens sent to two or more laboratories are numerous and frequently cited by those opposed to the test. I have found a wide variation in the technique of the test in different laboratories. These variations in technique may account for some of the discrepancies. The use of a heavy antigen suspension makes the reading of the test easier but reduces the number of positives and the titer obtained. Evans and, later, Hardy have found that the titer varies inversely with the concentration of the antigen; that is, if the antigen be diluted with an equal quantity of salt solution, the agglutination titer will be found one dilution higher than with the less diluted antigen. To obtain comparable results, the reagents used and the technique followed should be comparable.

The significance of agglutination in low titers can not be stated dogmatically. No absolute line can be drawn which will separate the clinical case of undulant fever from certain apparently well individuals whose blood may give agglutination to some degree. It is well known that some cases of undulant fever that have never given agglutination in any dilution higher than 1:80 have been proved by positive blood cultures. On the other hand it seems well established that certain individuals may acquire some agglutinating power as a result of frequent exposure to the infection either by ingestion or contact. Of 72 practicing veterinarians of Illinois, 3 gave complete agglutinations in 1:80, 1:160, and 1:640 dilutions, respectively; 5 others gave complete agglutination in dilutions varying from 1:10 to 1:40; 8 others gave partial agglutination in dilutions varying from

1:10 to 1:80. None of these men have a history of a clinically recognized attack of undulant fever.

Therefore, the diagnosis of undulant fever must be made by the attending physician, with the aid of the laboratory, and not by the laboratory man. The careful consideration of the clinical symptoms, together with the laboratory findings, will usually lead to the correct diagnosis.

Is the serological examination of livestock a practicable method of attacking the problem of undulant fever?

I have heard this question discussed by many veterinarians and livestock authorities and their views have been widely divergent. However, a considerable majority of the sound scientific thinkers believe that this procedure gives greater promise of stopping the tremendous loss to the livestock industry caused by infectious abortion than any other known method. It is the only method that has been successful in herds where the eradication of the disease has been attempted. Other methods have been tried with seeming success, but time has proved that they are not permanent.

The procedure consists of the application of the agglutination test to the blood serum of every animal in the herd, and the segregation and ultimate elimination of those reacting positively. Huddleson has devised a rapid agglutination test which may be applied in the field, and veterinarians report that it is sufficiently reliable for practical purposes. The plan must be applied to the herd as a unit and all additions to the herd from outside sources must be required to pass the test. Reacting animals may be removed by selling them for slaughter or by segregation from nonreactors. However, the maintenance of two herds, one infected and one noninfected, is not a paying proposition, and is not usually advised; but it may be desirable in case certain high-blooded stock is found infected. Fitch (2) and his associates have reported that segregation of the two groups of animals on a "no physical contact" plan, even though the two groups are only a few feet apart, has given most encouraging results.

It is probable that less than 1 per cent of infected cows will escape detection by the agglutination test, and these will very likely be found on retests of the herd.

The certified milk producers of California are requiring that all cows producing milk in certified herds shall be nonreactors to the abortus agglutination test. This requirement will probably be general within a few years. It will go far toward reducing the danger of undulant fever from certified milk. The only precaution that can be added is that of pasteurization of certified milk, which is now being done in a few localities.

The committee on abortion of the United States Livestock Sanitary Association (3) at their annual meeting in December, 1929, stated:

It has been definitely demonstrated that up to the present time the only method which has been clearly shown as satisfactory for the control of this infection is the clean herd on the basis of serological tests. * * * Your committee again wishes to call your attention to the fact that there is no doubt that cases of undulant fever occur in man which are undoubtedly contracted in laboratories, through milk and its products, and through contact with affected cattle and swine. Your committee further wishes to state, however, that in its judgment it has not been definitely found that any *one* source is the most important method of the transmission of the disease to man.

A similar committee of the United States Veterinary Medical Association made a report substantially the same. The reports of the committees were adopted by their respective associations.

To us as health officials the greatest weakness of the procedure of examination of livestock and the elimination of infected animals, is the length of time it will take to accomplish this gigantic task. For the protection of the health of the people we must rely upon education of those whose occupation subjects them to the hazard to guard against contact infections, and upon pasteurization to prevent milk-borne cases.

As to milk-borne infections the first essential is healthy cows. However, there is no criterion other than serological or cultural tests that will constantly determine the presence of the infection in the animal. Abortion, retained fetal membranes, sterility, and mastitis may suggest its presence; but frequently an infected animal is encountered that shows none of these signs or symptoms. Examination of the milk by ordinary bacteriological methods does not reveal the presence of *Brucella* therein, as these organisms grow too slowly to appear visible on the plate in 48 hours. Therefore, a milk that has an exceedingly low bacterial count may be heavily contaminated with the organisms of undulant fever. As the organism has its source in the cow's udder, no amount of cleanliness, inspection, sterilization of utensils, etc., will be of any account unless serological test of the animals be included. Pasteurization of the milk renders it safe and takes care not only of undulant fever but of all other communicable diseases transmitted by milk. Therefore, pasteurization must be our sheet anchor in the prevention of milk-borne undulant fever for at least a number of years. Mohler, chief of the Bureau of Animal Industry, says: "Infectious abortion is so widespread and the milk of so many animals is infected that the main dependence for protection against whatever danger there may be from *Bact. abortus* in milk must be placed in pasteurization which, if properly done, will make the milk safe until the dairymen can eradicate the disease form their herds."

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(1) Evans, Alice C.: Hyg. Lab. Bull., No. 143 (1925).
(2) Fitch, C. P., Boyd, W. L., and Delez, A. L.: Report of experimental work in the control of bovine infectious abortion. Jour. Am. Vet. Med. Assoc., Vol. 75 (U. S. Vol. 28), August, 1929, pp. 219–229.
(3) Report of Committee on Abortion, U. S. Live Stock Sanitary Association. Journ. Am. Vet. Med. Assoc., Vol. 76 (U. S. Vol. 29) pp. 339–341.

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for May, 1930

The accompanying table, taken from the Statistical Bulletin for June, 1930, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for May, 1930, as compared with the preceding month and with the corresponding month of last year. It also gives the cumulative rates for the period January–May for the years 1930 and 1929. Death rates are given for the principal causes of death. These rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada.

It is stated that in no preceding year have the winter and spring health conditions, as reflected by the death rates, been as favorable as in 1930. At the end of May the cumulative death rate for this group was 12.3 per cent below that for last year; and three of the five elapsed months—January, March, and May—recorded lower mortality rates than ever before registered for these months.

The May death rate was 8.7 per 1,000, as compared with 9 for May of last year. While this decline applied to all sections of the United States, among approximately 1,250,000 Canadian policyholders this year's May mortality rate was slightly higher than in 1929. For both countries, however, the cumulative death rate for the 5-month period January–May shows a marked improvement over the corresponding period of last year.

The Bulletin states:

Tuberculosis continues to be the most outstanding feature of the year's health record. The cumulative death rate at the end of May was at the remarkably low figure of 85 per 100,000, a reduction of 9.4 per cent from that registered for the like period of 1929. On the basis of what has happened in past years, we are justified in expecting that the tuberculosis death rate for the completed year will be at least 8 per cent below that registered for the January to May period. * * *

The death rates for all four of the principal epidemic diseases of childhood have been low during the five elapsed months of 1930. In this group interest attaches chiefly to diphtheria, whose death rate is now running 21.4 per cent below last year's figure, and at a new minimum. The influenza death rate is at about the normal figure prevailing in years not characterized by wide epidemic prevalence of this disease. The mortality from pneumonia has been unusually low for the

winter and spring seasons. Three important conditions—heart disease, cancer, and diabetes—which have had decidedly upward trends for years, show improvement in 1930 to date. The year bids fair to mark a decline in the death rate from cardiac conditions. The decline in the cumulative death rate for diabetes up to the end of May was 7.8 per cent. While this is an encouraging development (with respect to a disease whose death rate has shown a continuous increase for five years) too much significance must not be attached to it. It should be borne in mind that the comparison is with that period of 1929 when a widespread influenza epidemic prevailed in both the United States and Canada. This outbreak hastened the deaths of many diabetics, and the diabetes mortality rate, during the first half of 1929, was higher than ever before experienced during the winter and spring seasons. Developments of the next few months will determine whether or not the current year is destined to record a break in the steadily rising diabetes death rate. The improvement for cancer is very slight and will be wiped out entirely if small increases are recorded during the rest of the year.

A considerable decline in the mortality from puerperal conditions is one of the most favorable developments of the 1930 mortality record to date. In fact, there is good prospect that a new minimum will be established this year. The drop, as compared with the like period of 1929, amounted to 11.9 per cent.

There have been small increases this year for both suicides and homicides; and while the death rate from accidents, as a group, has declined, that for automobile fatalities has again increased decidedly. There is every prospect that 1930 will be an exceptional year, if not a record year, from the standpoint of public health; but there is no indication that any progress will be made with respect to public safety.

Death rates (annual basis) per 100,000 for principal causes of death, May, 1930

[Industrial department, Metropolitan Life Insurance Co.]

Cause of death	Death rate per 100,000 lives exposed [1]				
	May, 1930	April, 1930	May, 1929	Cumulative, January-May	
				1930	1929
Total, all causes	870.2	975.2	900.1	938.1	1,060.5
Typhoid fever	1.2	1.0	1.5	1.1	1.5
Measles	6.0	6.5	5.0	4.4	4.3
Scarlet fever	2.6	4.1	3.5	3.6	3.6
Whooping cough	4.4	4.4	5.0	4.6	6.5
Diphtheria	5.7	6.2	8.1	7.7	9.8
Influenza	13.9	19.8	20.3	23.1	83.4
Tuberculosis (all forms)	84.5	90.4	91.6	85.0	93.8
Tuberculosis of respiratory system	73.5	77.4	81.0	73.9	83.6
Cancer	73.0	78.5	76.9	75.2	76.4
Diabetes mellitus	18.3	19.6	18.5	20.1	21.8
Cerebral hemorrhage	59.5	65.4	[2] 55.8	62.8	[2] 62.3
Organic diseases of heart	143.5	164.2	145.0	159.3	168.9
Pneumonia (all forms)	89.1	118.7	81.2	110.0	136.7
Other respiratory diseases	12.0	13.5	11.6	13.0	15.1
Diarrhea and enteritis	11.3	11.8	13.9	11.5	13.4
Bright's disease (chronic nephritis)	67.5	76.4	70.3	71.2	76.5
Puerperal state	11.5	10.8	12.5	12.6	14.3
Suicides	10.1	10.3	8.9	9.4	8.7
Homicides	5.9	5.7	5.6	6.4	6.2
Other external causes (excluding suicides and homicides)	56.3	52.4	56.8	55.8	56.8
Traumatism by automobiles	19.0	17.9	16.9	17.7	15.9
All other causes	193.9	215.5	208.0	201.4	209.3

[1] All figures in this table include infants insured under one year of age and are subject to slight correction, as they are based on provisional estimates of lives exposed to risk.
[2] Rate not comparable with that for 1930.

COURT DECISION RELATING TO PUBLIC HEALTH

Infection as a result of vaccination held not compensable under workmen's compensation act.—(Connecticut Supreme Court of Errors; Smith *v.* Seamless Rubber Co. et al., 150 A. 110; decided Apr. 30, 1930.) In January, 1928, the city of New Haven was threatened with a smallpox epidemic. The board of health recommended that the residents be vaccinated. The company, by whom the plaintiff was employed, posted a notice that it desired to assist the board of health in its efforts to prevent a smallpox epidemic and offered to vaccinate employees without charge at the company's hospital. The matter of vaccination was entirely optional with the individual employees, and there was no penalty for failure to have it done. The physicians and nurses used the usual, necessary, and proper care. The plaintiff employee was vaccinated and, as a result thereof, contracted an infection of the blood stream, resulting in incapacity.

In a proceeding by the employee under the workmen's compensation act the commissioner concluded that, in choosing to be vaccinated, the plaintiff was not fulfilling any duty of her employment or doing any act incidental to it and that her incapacity was not the result of a risk involved in the employment or incident to it or to the conditions under which it was required to be performed. The trial court sustained these conclusions, and the plaintiff appealed to the supreme court. The latter court held that there was no error in the conclusions arrived at. In the opinion it was said, in part:

Where an employer merely permits an employee to perform a particular act, without direction or compulsion of any kind, the purpose and nature of the act becomes of great, often controlling, significance in determining whether an injury suffered while performing it is compensable. If the act is one for the benefit of the employer or for the mutual benefit of both, an injury arising out of it will usually be compensable; on the other hand, if the act being performed is for the exclusive benefit of the employee, so that it is a personal privilege, or is one which the employer permits the employee to undertake for the benefit of some other person or for some cause apart from his own interests, an injury arising out of it will not be compensable.

* * * We can not therefore assume as a necessary inference from the situation disclosed by the record that the opportunity given to the employees of the company to secure vaccination was so extended to them for its benefit rather than as a personal privilege or a means of serving the general good of the community. Lacking this fact, the conclusions of the commissioner can not be held to be violative of any rule of law or unreasonable or illogical. They must therefore stand. * * *

DEATHS DURING WEEK ENDED JULY 5, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended July 5, 1930, and corresponding week of 1929. (From the Weekly Health Index, July 9, 1930, issued by the Bureau of the Census, Department of Commerce)

	Week ended July 5, 1930	Corresponding week, 1929
Policies in force	76, 053, 026	74, 490, 653
Number of death claims	10, 153	10, 158
Death claims per 1,000 policies in force, annual rate	7. 0	7. 1

Deaths from all causes in certain large cities of the United States during the week ended July 5, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, July 9, 1930, issued by the Bureau of the Census, Department of Commerce)

City	Week ended July 5, 1930		Annual death rate per 1,000, corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended July 5, 1930 [2]
	Total deaths	Death rate [1]		Week ended July 5, 1930	Corresponding week, 1929	
Total (65 cities)	5, 925	10. 4	10. 3	568	556	[3] 49
Akron	35			7	4	64
Albany [4]	24	10. 4	13. 0	1	3	22
Atlanta	68	13. 9	15. 1	15	12	159
White	32			6	7	190
Colored	36	(5)	(5)	9	5	143
Baltimore [4]	158	9. 9	9. 5	10	11	34
White	117			7	7	30
Colored	41	(5)	(5)	3	4	49
Birmingham	88	20. 6	17. 8	11	8	103
White	46			4	5	62
Colored	42	(5)	(5)	7	3	166
Boston	187	12. 2	10. 5	18	22	51
Bridgeport	29			1	1	17
Buffalo	121	11. 4	11. 9	13	13	58
Cambridge	15	6. 2	9. 1	2	2	37
Camden	15	5. 8	8. 5	1	3	18
Canton	21	9. 4	8. 9	0	4	0
Chicago [4]	590	9. 7	10. 1	59	36	52
Cincinnati	102			4	12	24
Cleveland	151	7. 8	7. 7	16	9	48
Columbus	68	11. 9	11. 0	2	4	20
Dallas	55	13. 2	14. 1	7	7	
White	42			5	7	
Colored	13	(5)	(5)	2	0	
Dayton	34	9. 6	11. 9	4	3	59
Denver	78	13. 8	13. 1	12	6	125
Des Moines	30	10. 3	10. 0	2	2	35
Detroit	219	8. 3	9. 8	30	27	46
Duluth	16	7. 1	7. 1	0	1	0
El Paso	44	19. 5	16. 8	12	7	
Erie	17			4	1	85
Fall River [4]	24	9. 3	8. 2	3	0	69
Flint	18	6. 3	7. 4	3	3	35
Fort Worth	37	11. 3	11. 0	3	11	
White	31			1	9	
Colored	6	(5)	(5)	2	2	
Grand Rapids	25	7. 9	9. 5	2	7	30
Houston	142			7	3	
White	55			3	3	
Colored	87	(5)	(5)	4	0	
Indianapolis	86	11. 7	10. 9	2	5	15
White	73			2	3	17
Colored	13	(5)	(5)	0	2	0
Jersey City	56	9. 0	6. 6	6	8	52
Kansas City, Kans	16	7. 1	12. 8	1	5	24
White	10			0	4	0
Colored	6	(5)	(5)	1	1	217
Kansas City, Mo	90	12. 0	13. 2	10	13	78
Knoxville	31	15. 3	14. 8	5	2	117
White	26			4	2	104
Colored	5	(5)	(5)	1	0	247

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended July 5, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, July 9, 1930, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended July 5, 1930		Annual death rate per 1,000, corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended July 5, 1930 [2]
	Total deaths	Death rate [1]		Week ended July 5, 1930	Corresponding week, 1929	
Los Angeles	247			21	11	64
Louisville	69	10.9	7.8	5	3	43
White	54			5	1	49
Colored	15	(5)	(5)	0	2	0
Lowell	24			4	1	95
Lynn	15	7.4	7.9	1	2	25
Memphis	91	24.9	17.8	13	8	155
White	43			6	4	110
Colored	48	(5)	(5)	7	4	236
Milwaukee	79	7.6	8.7	12	15	60
Minneapolis	71	8.1	7.9	6	4	39
Nashville	42	15.7	16.4	7	10	108
White	24			5	8	103
Colored	18	(5)	(5)	2	2	127
New Bedford	24			1	0	26
New Haven	31	8.6	11.1	1	1	19
New Orleans	129	15.7	16.9	14	15	81
White	70			6	5	53
Colored	59	(5)	(5)	8	10	135
New York	1,159	10.0	10.1	115	106	48
Bronx Borough	152	8.3	9.5	12	16	28
Brooklyn Borough	395	8.9	8.5	41	47	44
Manhattan Borough	449	13.4	12.9	46	29	75
Queens Borough	126	7.7	7.8	11	11	32
Richmond Borough	37	12.8	15.9	5	3	93
Newark, N. J	70	7.7	7.4	5	2	26
Oakland	60	11.4	12.9	3	4	36
Oklahoma City	29			5	3	98
Omaha	59	13.8	11.2	7	4	80
Paterson	29	10.4	10.8	1	4	17
Philadelphia	421	10.6	8.1	20	13	30
Pittsburgh	136	10.5	10.2	17	15	62
Portland, Oreg	62			4	4	49
Providence	53	9.7	7.8	5	10	46
Richmond	43	11.5	10.5	5	6	74
White	28			3	3	67
Colored	15	(5)	(5)	2	3	87
Rochester	59	9.4	7.6	3	3	27
St. Louis	170	10.5	13.3	6	24	19
St. Paul	34			1	5	10
Salt Lake City [4]	26	9.8	11.3	5	2	79
San Antonio	69	16.5	15.1	14	17	
San Diego	37			2	0	42
San Francisco	132	11.8	12.7	5	9	34
Schenectady	12	6.7	8.9	0	2	0
Seattle	86	11.7	9.3	4	2	40
Somerville	16	8.1	6.1	1	1	33
Spokane	20	9.6	14.3	9	1	235
Springfield, Mass	27	9.4	10.4	4	0	63
Syracuse	34	8.9	9.4	3	5	37
Tacoma	29	13.7	7.1	0	0	0
Toledo	52	8.7	9.2	2	7	18
Trenton	27	10.1	10.5	3	4	56
Utica	19	9.5	12.0	2	3	57
Washington, D. C	126	11.9	10.8	9	12	52
White	76			4	4	35
Colored	50	(5)	(5)	5	8	89
Waterbury	18			4	4	102
Wilmington, Del	23	9.3	6.9	2	2	45
Worcester	43	11.3	11.1	5	4	65
Yonkers	14	6.0	6.9	1	0	24
Youngstown	19	5.7	8.4	3	2	47

[1] Annual rate per 1,000 population.
[2] Deaths under 1 year per 1,000 births. Cities left blank are not in the registration area for births.
[3] Data for 73 cities.
[4] Deaths for week ended Friday.
[5] In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended July 5, 1930, and July 6, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 5, 1930, and July 6, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 5, 1930	Week ended July 6, 1929	Week ended July 5, 1930	Week ended July 6, 1929	Week ended July 5, 1930	Week ended July 6, 1929	Week ended July 5, 1930	Week ended July 6, 1929
New England States:								
Maine	1			2	17	48	0	0
New Hampshire		1			2	20	0	0
Vermont	2	1			9	3	0	0
Massachusetts	31	49		1	409	282	0	4
Rhode Island	2	5			17	24	0	0
Connecticut	5	10			20	49	1	1
Middle Atlantic States:								
New York	89	169	[1] 6	[1] 10	824	458	7	23
New Jersey	38	63	4		502	101	2	1
Pennsylvania	103	126			791	747	4	6
East North Central States:								
Ohio	20	28	3	9	205	486	1	1
Indiana	7	12			60	83	3	1
Illinois	98	156	16	8	222	651	3	4
Michigan	44	87		4	316	324	10	40
Wisconsin	12	16	1	10	308	676	1	5
West North Central States:								
Minnesota	4	18			72	101	0	1
Iowa	4	4			14	27	1	1
Missouri	21	29			38	36	3	8
North Dakota		6			2	21	0	3
South Dakota	4				19	7	0	0
Nebraska	5	7		2	47	181	3	1
Kansas	11	9		1	103	206	1	1
South Atlantic States:								
Delaware					11	2	0	0
Maryland [2]	7	14	2	1	19	25	1	1
District of Columbia	6	4			43	6	1	0
West Virginia	10	7	6	6	82	63	4	0
North Carolina	6	14	9		40	9	1	3
South Carolina	9	7	69	91			1	0
Georgia		4	4	6	29		0	0
Florida	2	3		29	14	12	0	2

[1] New York City only.

[2] Week ended Friday.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 5, 1930, and July 6, 1929*—Continued**

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 5, 1930	Week ended July 6, 1929	Week ended July 5, 1930	Week ended July 6, 1929	Week ended July 5, 1930	Week ended July 6, 1929	Week ended July 5, 1930	Week ended July 6, 1929
East South Central States:								
Kentucky					3		0	1
Tennessee	1	4	2	2	24	5	7	2
Alabama	3	8	2	5	21	26	1	1
Mississippi	4	6					4	0
West South Central States:								
Arkansas	5	1	3	2	8	10	0	0
Louisiana	12	10	3	2	7	13	2	2
Oklahoma [3]	3	13	2	20	41	14	2	0
Texas	21	15	7	20	51	61	0	1
Mountain States:								
Montana	2	3			5	26	0	0
Idaho		1		2	4	8	0	1
Wyoming					12	2	0	0
Colorado	3	3			160	6	0	4
New Mexico	5	2			19		0	0
Arizona		2			34	1	2	1
Utah [2]		2		2	23	4	2	1
Pacific States:								
Washington	1	11		1	173	39	0	1
Oregon	3	4	3	5	53	62	0	2
California	46	37	22	9	665	73	2	13

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 5, 1930	Week ended July 6, 1929	Week ended July 5, 1930	Week ended July 6, 1929	Week ended July 5, 1930	Week ended July 6, 1929	Week ended July 5, 1930	Week ended July 6, 1929
New England States:								
Maine	0	0	6	20	0	1	0	2
New Hampshire	1	0	0	1	0	0	0	0
Vermont	0	0	8	0	0	3	0	0
Massachusetts	2	1	60	77	0	1	0	5
Rhode Island	0	0	4	6	0	0	0	0
Connecticut	0	0	16	18	0	0	1	3
Middle Atlantic States:								
New York	1	4	91	109	27	0	16	20
New Jersey	0	0	49	40	0	0	4	8
Pennsylvania	1	0	197	203	0	0	15	18
East North Central States:								
Ohio	4	1	88	70	72	67	10	3
Indiana	11	1	38	36	101	55	3	3
Illinois	5	1	126	164	63	76	8	9
Michigan	0	1	65	162	42	80	4	5
Wisconsin	0	1	43	61	10	21	2	2
West North Central States:								
Minnesota	10	2	27	20	0	0	3	7
Iowa	0	0	8	33	73	55	3	4
Missouri	1	0	33	11	19	9	9	19
North Dakota	0	0	1	8	10	3	0	0
South Dakota	0	0	6	7	14	11	1	1
Nebraska	0	0	24	15	39	18	0	0
Kansas	0	0	24	24	72	44	6	2
South Atlantic States:								
Delaware	0	0	0	0	0	0	0	0
Maryland [2]	0	1	26	31	0	0	8	19
District of Columbia	0	0	4	7	0	0	0	1
West Virginia	1	0	15	7	2	12	8	11
North Carolina	3	4	15	13	8	9	29	25
South Carolina	4	1	5	3	1	2	82	79
Georgia	0	1	1	7	0	0	47	34
Florida	0	0	0	2	0	0	2	13
East South Central States:								
Kentucky	0	0	8	0	0	3	6	20
Tennessee	2	3	7	7	4	1	52	27
Alabama	0	2	16	16	0	0	31	37
Mississippi	0	0	2	6	1	0	38	30

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa, and for 1929 are exclusive of Tulsa only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 5, 1930, and July 6, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 5, 1930	Week ended July 6, 1929	Week ended July 5, 1930	Week ended July 6, 1929	Week ended July 5, 1930	Week ended July 6, 1929	Week ended July 5, 1930	Week ended July 6, 1929
West South Central States:								
Arkansas	0	0	2	2	2	6	20	10
Louisiana	20	0	15	7	2	0	29	18
Oklahoma [3]	11	0	7	17	55	27	27	27
Texas	4	0	18	7	77	12	22	21
Mountain States:								
Montana	0	0	5	10	6	11	1	0
Idaho	0	0	1	1	3	5	0	0
Wyoming	0	0	2	1	0	18	1	1
Colorado	1	0	11	6	7	18	2	4
New Mexico	1	0	2	4	2	0	5	8
Arizona	0	0	2	4	3	9	17	3
Utah [2]	0	0	5	0	0	4	1	0
Pacific States:								
Washington	2	0	11	12	30	21	1	5
Oregon	0	1	4	8	8	17	8	1
California	88	4	38	124	17	32	10	8

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa, and for 1929 are exclusive of Tulsa only.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May, 1930										
Kansas	7	41	2	3	2,654	1	1	237	221	21
Mississippi	13	35	753	5,732	660	1,438	5	22	56	54
June, 1930										
Arizona	10	4	3		228		2	13	11	24
Arkansas	9	7	13	227	84	118	1	9	12	45
Connecticut	6	47	9	1	146		3	161	0	3
Indiana	14	43	26		530		0	260	440	28
Wyoming		5			184		0	9	48	1

May, 1930

	Cases
Chicken pox:	
Kansas	309
Mississippi	679
Dengue:	
Mississippi	8
Dysentery:	
Kansas (bacillary)	2
Mississippi (amebic)	104
Mississippi (bacillary)	2,336
Epidermophytosis:	
Kansas	2
German measles:	
Kansas	10
Hookworm disease:	
Mississippi	345
Impetigo contagiosa:	
Kansas	1
Lethargic encephalitis:	
Kansas	1
Mumps:	
Kansas	370
Mississippi	801
Ophthalmia neonatorum:	
Mississippi	14
Paratyphoid fever:	
Kansas	1
Puerperal septicemia:	
Mississippi	25
Rabies in animals:	
Mississippi	9
Scabies:	
Kansas	8
Septic sore throat:	
Kansas	4
Trachoma:	
Kansas	2
Mississippi	3
Tularaemia:	
Kansas	1

Undulant fever:	Cases
Kansas	1
Vincent's angina:	
Kansas	3
Whooping cough:	
Kansas	387
Mississippi	1,491
June, 1930	
Chicken pox:	
Arizona	27
Arkansas	17
Connecticut	281
Indiana	179
Wyoming	7
Dysentery:	
Arizona	4
Connecticut (bacillary)	3
German measles:	
Connecticut	154
Wyoming	9
Hookworm disease:	
Arkansas	5
Impetigo contagiosa:	
Wyoming	1
Lead poisoning:	
Connecticut	1
Leprosy:	
Arizona	1
Mumps:	
Arizona	45
Arkansas	26
Connecticut	112

Mumps—Continued.	Cases
Indiana	11
Wyoming	11
Ophthalmia neonatorum:	
Arkansas	1
Paratyphoid fever:	
Connecticut	1
Rabies in animals:	
Connecticut	1
Rocky Mountain spotted or tick fever:	
Wyoming	10
Septic sore throat:	
Connecticut	3
Tetanus:	
Connecticut	1
Trachoma:	
Arizona	5
Arkansas	4
Connecticut	1
Wyoming	4
Undulant fever:	
Arizona	3
Connecticut	2
Indiana	4
Vincent's angina:	
Wyoming	1
Whooping cough:	
Arizona	54
Arkansas	108
Connecticut	172
Indiana	148
Wyoming	9

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,665,000. The estimated population of the 89 cities reporting deaths is more than 30,070,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended June 28, 1930, and June 29, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	780	1,229	
96 cities	402	640	641
Measles:			
45 States	8,262	6,818	
96 cities	3,002	1,621	
Meningococcus meningitis:			
46 States	95	151	
96 cities	32	87	
Poliomyelitis:			
47 States	120	25	
Scarlet fever:			
46 States	1,631	1,786	
96 cities	665	675	598
Smallpox:			
46 States	769	612	
96 cities	80	93	35
Typhoid fever:			
46 States	492	547	
96 cities	80	75	80
Deaths reported			
Influenza and pneumonia:			
89 cities	410	390	
Smallpox:			
89 cities	0	0	

City reports for week ended June 28, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	7	1	0		0	1	10	2
New Hampshire:								
Concord	0	0	0		0	0	0	0
Nashua	0	0	0		0	10	0	0
Vermont:								
Barre	1	0	0		0	18	0	0
Burlington	0	0	0		0	0	0	0
Massachusetts:								
Boston	44	29	19		0	236	24	10
Fall River	1	2	2		0	0	6	0
Springfield	5	2	1		0	1	0	0
Worcester	14	2	1		0	66	0	1
Rhode Island:								
Pawtucket	0	0	0		0	1	0	1
Providence	4	4	5		0	17	1	1
Connecticut:								
Bridgeport	1	4	0		0	0	1	0
Hartford	5	3	0		0	0	0	4
New Haven	3	1	0		0	4	2	3
MIDDLE ATLANTIC								
New York:								
Buffalo	12	9	7		0	19	5	12
New York	94	204	89	5	3	836	82	96
Rochester	0	7	1		0	6	1	1
Syracuse	7	3	0		0	49	16	0
New Jersey:								
Camden	2	5	3		0	21	0	0
Newark		10						
Trenton	0	2	1		0	3	0	5
Pennsylvania:								
Philadelphia	46	46	13		0	190	70	19
Pittsburgh	20	15	13		0	132	9	18
Reading	1	2	1		0	0	8	1
Scranton	1	2	0		0	0	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	4	4	1		0	32	10	3
Cleveland	94	21	8		0	24	13	11
Columbus	5	2	3	1	2	51	6	1
Toledo	38	4	1		0	7	3	2
Indiana:								
Fort Wayne	0	1	2		0	1	0	1
Indianapolis	10	2	1		0	53	4	10
South Bend	3	1	3		0	2	0	1
Terre Haute	0	0	0		0	0	0	2
Illinois:								
Chicago	94	71	97	1	2	33	82	41
Springfield	0	1	0		0	30	0	0
Michigan:								
Detroit	37	37	40		0	153	22	15
Flint	10	2	1		0	118	1	3
Grand Rapids	2	1	0		0	0	0	0
Wisconsin:								
Kenosha	3	0	0		0	0	0	0
Madison	4	0	0		0	14	0	0
Milwaukee	77	10	1		0	30	32	2
Racine	8	1	0		0	6	1	0
Superior	0	0	0		0	0	0	0

City reports for week ended June 28, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL								
Minnesota:								
Duluth	2	0	0	...	0	11	0	1
Minneapolis	38	10	3	...	0	8	3	4
St. Paul	37	7	2	...	0	1	4	3
Iowa:								
Davenport	0	1	0	...	...	1	0	...
Des Moines	3	1	0	...	...	0	0	...
Sioux City	0	0	0	...	...	6	0	...
Waterloo	3	0	0	...	...	2	0	...
Missouri:								
Kansas City	5	2	5	...	0	3	0	11
St. Joseph	0	1	0	...	0	0	0	3
St. Louis	21	22	22	...	...	51	16	...
North Dakota:								
Fargo	0	0	0	...	0	1	6	1
Grand Forks	0	0	0	...	...	0	0	0
South Dakota:								
Aberdeen	4	0	0	...	...	24	0	...
Sioux Falls	0	0	0	...	...	0	0	...
Nebraska:								
Omaha	6	2	3	...	0	25	0	4
Kansas:								
Topeka	9	0	1	...	0	14	9	0
Wichita	1	0	1	...	0	17	0	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0	...	0	0	0	3
Maryland:								
Baltimore	48	14	5	...	0	8	7	11
Cumberland	0	0	0	...	[1] 1	2	0	6
Frederick	0	0	0	...	0	0	0	0
District of Columbia:								
Washington	11	5	5	...	1	48	0	3
Virginia:								
Lynchburg	3	0	0	...	0	2	10	1
Norfolk	0	0	0	...	0	3	2	2
Richmond	1	1	0	...	0	7	1	1
Roanoke	2	0	0	...	0	16	0	0
West Virginia:								
Charleston	1	0	0	...	0	0	1	0
Wheeling	2	0	0	...	0	5	0	3
North Carolina:								
Raleigh	0	0	0	...	0	0	0	0
Wilmington	0	0	0	...	0	0	0	0
Winston-Salem	0	0	0	2	0	1	3	2
South Carolina:								
Charleston	1	0	0	...	0	2	1	1
Columbia	0	0	0	...	0	1	3	2
Georgia:								
Atlanta	0	2	2	1	1	15	2	8
Brunswick	0	0	0	...	0	4	0	0
Savannah	0	0	0	...	0	8	1	0
Florida:								
Miami	0	1	1	...	0	1	0	2
St. Petersburg	...	0	...	...	0	...	...	1
Tampa	0	1	1	...	0	9	2	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	0	0	...	1	7	0	0
Tennessee:								
Memphis	3	1	1	...	0	0	0	6
Nashville	0	0	0	...	0	16	0	1
Alabama:								
Birmingham	0	1	1	...	1	15	1	5
Mobile	0	0	0	...	0	0	0	2
Montgomery	0	0	0	...	...	0	0	...

[1] Nonresident.

City reports for week ended June 28, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0			1	0	
Little Rock	0	0	0		0	0	0	3
Louisiana:								
New Orleans	0	5	4		2	0	0	8
Shreveport	2	0	0		0	1	1	1
Oklahoma:								
Tulsa	0	0	1			0	0	
Texas:								
Dallas	0	3	6		0	2	2	1
Fort Worth	0	1	0		0	0	0	4
Galveston	0	0	0		0	0	0	0
Houston	0	2	0		0	1	0	8
San Antonio	1	1	0		1	0	0	3
MOUNTAIN								
Montana:								
Billings	0	0	0		0	3	0	0
Great Falls	3	0	0		0	0	0	0
Helena	0	0	0		0	0	0	1
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	6	0	0
Colorado:								
Denver	10	8	0		0	61	8	5
Pueblo	3	1	0		0	40	13	0
New Mexico:								
Albuquerque	2	0	0		0	6	0	0
Arizona:								
Phoenix	0	0	0		0	11	0	4
Utah:								
Salt Lake City	5	3	0		0	55	1	3
Nevada:								
Reno		0						
PACIFIC								
Washington:								
Seattle	10	3	1			109	36	
Spokane	8	2	3			23	0	
Tacoma	3	2	0		0	28	0	1
Oregon:								
Portland	0	5	0		0	34	4	4
Salem	0	0	0		0	1	0	0
California:								
Los Angeles	33	33	21	17	0	196	39	13
Sacramento	1	2	1	1	1	11	10	1
San Francisco	10	10	1	3	0	27	13	3

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	1	1	0	0	0	0	1	0	0	7	21
New Hampshire:											
Concord	1	0	0	0	0	1	0	0	0	0	4
Nashua	0	0	0	0	0	0	0	0	0	0	
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	2
Burlington	0	0	0	0	0	0	0	0	0	0	6
Massachusetts:											
Boston	39	34	0	0	0	14	1	1	0	55	161
Fall River	2	2	0	0	0	3	0	0	0	1	19
Springfield	3	3	0	0	0	3	0	0	0	3	30
Worcester	5	5	0	0	0	4	0	0	0	6	40

City reports for week ended June 28, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND—continued											
Rhode Island:											
Pawtucket	0	0	0	0	0	1	0	0	0	0	17
Providence	4	4	0	0	0	3	1	1	0	1	57
Connecticut:											
Bridgeport	4	1	0	0	0	3	1	0	0	0	22
Hartford	2	3	0	0	0	6	0	2	0	1	57
New Haven	1	3	0	0	0	1	0	0	0	5	36
MIDDLE ATLANTIC											
New York:											
Buffalo	15	18	0	0	0	7	0	0	0	23	128
New York	116	53	0	0	0	124	15	8	3	70	1,378
Rochester	6	11	0	0	0	1	0	0	0	2	60
Syracuse	3	3	0	0	0	1	0	0	0	49	37
New Jersey:											
Camden	3	3	0	0	0	1	0	0	0	1	30
Newark	13	-------	0	-------	-------	-------	1	-------	-------	-------	-------
Trenton	1	6	0	0	0	2	0	0	0	2	40
Pennsylvania:											
Philadelphia	47	53	0	0	0	26	3	0	0	15	394
Pittsburgh	17	31	0	0	0	6	1	0	0	45	162
Reading	1	2	0	0	0	1	0	0	0	5	16
Scranton	1	1	0	0	0	0	1	0	0	3	-------
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	7	7	0	0	0	6	1	0	0	3	125
Cleveland	22	21	0	2	0	11	2	0	0	59	186
Columbus	4	3	0	0	0	4	0	0	0	10	70
Toledo	6	11	0	4	0	2	1	1	1	2	50
Indiana:											
Fort Wayne	1	1	1	0	0	2	0	0	1	0	34
Indianapolis	4	7	4	4	0	4	1	13	0	0	-------
South Bend	1	4	0	0	0	1	0	0	0	0	20
Terre Haute	1	0	0	0	0	0	0	0	0	0	23
Illinois:											
Chicago	68	153	1	3	0	55	3	0	0	76	596
Springfield	1	5	0	0	0	0	0	0	0	0	33
Michigan:											
Detroit	53	54	2	4	0	31	2	3	0	109	261
Flint	4	12	1	2	0	1	1	0	0	23	27
Grand Rapids	4	6	0	1	0	2	1	0	0	1	35
Wisconsin:											
Kenosha	1	6	1	0	0	0	0	0	0	3	8
Madison	0	7	0	1	-------	-------	0	0	-------	20	-------
Milwaukee	13	10	0	0	0	8	0	0	0	32	110
Racine	2	3	0	0	0	0	0	0	0	3	10
Superior	2	1	0	0	0	0	0	0	0	0	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth	5	1	0	0	0	1	0	0	0	6	17
Minneapolis	17	5	2	0	0	3	0	0	0	6	88
St. Paul	10	6	0	0	0	3	0	2	0	7	63
Iowa:											
Davenport	0	0	1	24	-------	-------	0	0	-------	0	-------
Des Moines	3	1	1	38	-------	-------	0	0	-------	0	30
Sioux City	0	2	1	0	-------	-------	0	0	-------	3	-------
Waterloo	1	0	0	3	-------	-------	0	0	-------	8	-------
Missouri:											
Kansas City	4	9	1	0	0	8	1	1	0	7	117
St. Joseph	0	0	1	4	0	0	0	0	0	0	-------
St. Louis	13	23	1	5	0	11	2	4	0	19	263
North Dakota:											
Fargo	1	0	0	1	0	0	0	0	0	0	14
Grand Forks	1	0	0	4	-------	-------	0	0	-------	0	-------
South Dakota:											
Aberdeen	0	1	0	4	-------	-------	0	0	-------	4	-------
Sioux Falls	0	0	0	4	-------	-------	0	0	-------	0	-------

City reports for week ended June 28, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—continued											
Nebraska:											
Omaha	1	0	2	11	0	4	0	0	0	0	57
Kansas:											
Topeka	0	2	0	3	0	0	1	0	0	22	13
Wichita	1	3	0	0	0	2	0	0	0	1	35
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	1	0	0	0	0	0	0	0	3	24
Maryland:											
Baltimore	14	16	0	0	0	25	3	3	0	39	202
Cumberland	0	0	0	0	0	0	0	0	0	1	11
Frederick	0	0	0	0	0	0	0	0	0	0	3
District of Col.:											
Washington	9	7	0	0	0	11	1	0	0	12	129
Virginia:											
Lynchburg	0	0	0	0	0	0	0	0	1	7	16
Norfolk	1	0	0	0	0	3	0	0	0	6	--------
Richmond	1	1	0	0	0	3	2	4	0	2	52
Roanoke	0	1	0	0	0	1	0	0	0	0	26
West Virginia:											
Charleston	0	1	0	0	0	1	0	1	0	3	15
Wheeling	1	0	0	0	0	1	0	0	0	1	20
North Carolina:											
Raleigh	0	0	0	4	0	1	0	0	0	5	14
Wilmington	0	1	0	0	0	0	0	0	0	8	13
Winston-Salem	0	1	0	0	0	1	1	0	0	20	21
South Carolina:											
Charleston	0	1	0	0	0	3	1	1	0	2	19
Columbia	0	0	0	0	0	1	1	1	0	1	26
Georgia:											
Atlanta	2	4	2	1	0	7	3	8	1	2	116
Brunswick	0	0	0	0	0	0	0	0	0	0	6
Savannah	0	0	0	0	0	3	1	1	0	0	36
Florida:											
Miami	0	0	0	0	0	2	1	0	0	1	27
St. Petersburg	0	--------	0	--------	0	1	0	--------	0	--------	10
Tampa	0	0	0	0	0	0	0	1	0	2	28
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	4	0	1	0	1	0	0	0	0	22
Tennessee:											
Memphis	2	2	0	0	0	5	4	6	0	13	100
Nashville	0	2	0	0	0	5	4	3	0	3	59
Alabama:											
Birmingham	1	0	1	0	0	4	3	0	0	3	87
Mobile	0	1	0	0	0	1	1	0	0	0	23
Montgomery	0	0	0	0	--------	--------	1	1	--------	0	--------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	1	--------	--------	0	0	--------	16	--------
Little Rock	0	0	0	0	--------	1	1	1	0	0	--------
Louisiana:											
New Orleans	3	9	0	0	0	14	3	3	1	1	190
Shreveport	0	0	0	1	0	1	0	1	1	0	30
Oklahoma:											
Tulsa	1	0	0	2	--------	--------	2	0	--------	6	--------
Texas:											
Dallas	2	0	1	1	0	2	2	2	0	8	59
Fort Worth	1	0	1	0	0	2	1	0	0	0	28
Galveston	0	0	0	0	0	1	1	1	0	0	11
Houston	1	2	0	0	0	2	1	0	0	0	77
San Antonio	1	0	2	3	0	7	1	1	0	0	74

City reports for week ended June 28, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	11
Great Falls	0	2	1	0	0	1	0	0	0	0	8
Helena	0	0	0	0	0	0	0	0	0	0	9
Missoula	0	0	0	3	0	0	0	0	0	0	11
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	3	5
Colorado:											
Denver	6	2	0	1	0	2	0	1	0	36	80
Pueblo	1	0	0	0	0	0	0	2	0	4	12
New Mexico:											
Albuquerque	0	0	0	0	0	4	0	0	0	0	9
Arizona:											
Phoenix	0	0	0	0	0	4	0	1	0	0	25
Utah:											
Salt Lake City	2	3	1	0	0	0	0	1	0	34	34
Nevada:											
Reno	0		0				0				
PACIFIC											
Washington:											
Seattle	4	3	1	1			1	1		21	
Spokane	2	0	3	10			0	0		9	
Tacoma	1	0	2	0	0	2	0	0	0	1	28
Oregon:											
Portland	3	1	7	10	0	2	0	1	0	4	65
Salem	0	0	1	0	0	0	0	0	0	2	
California:											
Los Angeles	19	14	3	10	0	22	3	1	0	36	243
Sacramento	2	4	0	0	0	4	2	0	1	0	26
San Francisco	10	3	0	0	0	10	1	0	0	1	155

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	1	2	1	1	0	0	0	0	0
Worcester	2	1	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York	6	5	1	1	0	0	3	2	0
Rochester	0	1	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	0	0	0	1	0	0	0	0	0
Pittsburgh	0	1	0	1	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	1	0	0	0	0	0	1	0
Columbus	1	1	0	0	0	0	0	0	0
Illinois:									
Chicago	5	2	2	2	0	1	0	1	0
Springfield	0	0	0	0	0	0	0	1	0
Michigan:									
Detroit	5	3	1	0	0	0	0	0	0
Wisconsin:									
Madison	1		0		0		0	0	
Milwaukee	1	1	1	1	0	0	0	0	0

City reports for week ended June 28, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST NORTH CENTRAL									
Missouri:									
Kansas City	0	2	0	0	0	0	0	0	0
St. Louis	2	1	0	0	0	0	0	0	0
North Dakota:									
Fargo	0	0	0	1	0	0	0	0	0
Kansas:									
Topeka	0	1	0	0	0	0	0	0	0
SOUTH ATLANTIC [1]									
District of Columbia:									
Washington	0	1	0	0	0	0	0	0	0
Virginia:									
Lynchburg	0	0	0	0	1	0	0	0	0
West Virginia:									
Wheeling	1	0	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	0	1	0	0	0
Winston-Salem	0	0	0	0	5	3	0	0	0
South Carolina:									
Charleston	0	0	0	0	0	1	0	0	0
Columbia	0	1	0	0	0	1	0	0	0
Georgia:									
Atlanta	0	0	0	0	5	3	0	0	1
Savannah [1]	1	0	0	0	0	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	3	2	0	0	0	1	0	0	0
Nashville	0	0	0	0	0	1	0	0	0
Alabama:									
Mobile [2]	0	0	0	0	0	1	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	2	1	0	0	7	0	1	0	0
Shreveport	0	0	0	0	0	1	0	1	0
Texas:									
Dallas	0	0	0	0	4	1	1	0	0
Fort Worth	0	0	0	0	0	1	0	0	0
Houston	0	0	0	0	0	1	0	0	0
MOUNTAIN									
Montana:									
Great Falls	0	0	0	0	0	0	0	1	0
Colorado:									
Denver	0	2	0	0	0	0	0	0	0
Utah:									
Salt Lake	1	1	0	0	0	0	0	0	0
PACIFIC									
Oregon:									
Portland	0	0	0	1	0	0	0	0	0
California:									
Los Angeles	1	0	0	0	0	0	1	29	0
San Francisco	0	0	0	0	2	0	0	2	1

[1] Typhus fever, 2 cases: 1 case at Savannah, Ga., and 1 case at Tampa, Fla.
[2] Dengue: 1 case at Mobile, Ala.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended June 28, 1930, compared with those for a like period ended June 29, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, May 25 to June 28, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929
98 cities	77	124	77	110	[2] 80	106	[3] 68	112	[4] 66	110
New England	51	90	86	72	[5] 36	79	35	74	62	94
Middle Atlantic	71	168	72	148	82	131	81	125	[6] 64	141
East North Central	111	155	113	123	129	145	93	165	98	131
West North Central	76	110	51	96	[7] 54	65	[8] 31	87	70	85
South Atlantic	55	41	49	54	[9] 40	64	[9] 34	64	24	34
East South Central	40	7	13	21	13	41	13	34	13	34
West South Central	52	57	41	88	86	84	86	65	37	69
Mountain	43	35	60	61	[10] 35	35	[10] 9	26	[10] 0	26
Pacific	78	58	76	56	43	31	54	58	61	84

MEASLES CASE RATES

98 cities	932	659	957	734	[2] 838	483	[3] 667	423	[4] 494	267
New England	1,426	364	1,462	602	[5] 1,401	337	1,048	391	762	211
Middle Atlantic	991	183	1,076	169	1,089	143	818	123	[6] 628	99
East North Central	529	1,597	517	1,827	457	1,152	381	1,010	334	620
West North Central	514	1,033	412	1,060	[7] 369	581	[8] 347	501	264	256
South Atlantic	725	298	478	238	[9] 374	242	[9] 387	129	234	137
East South Central	378	55	418	41	182	41	270	41	256	7
West South Central	486	236	123	400	101	209	82	183	19	156
Mountain	5,527	252	5,630	192	[10] 3,386	261	[10] 2,667	218	[10] 1,447	148
Pacific	1,630	398	2,220	408	1,564	384	1,247	352	931	208

SCARLET FEVER CASE RATES

98 cities	186	269	214	209	[2] 193	188	[3] 145	148	[4] 109	112
New England	281	269	230	191	[5] 200	204	115	159	124	119
Middle Atlantic	171	193	196	135	155	129	118	100	[6] 90	72
East North Central	142	447	296	321	304	322	229	260	184	191
West North Central	209	179	260	165	[7] 242	110	[8] 154	77	97	104
South Atlantic	115	273	156	300	[9] 149	133	[9] 100	73	62	62
East South Central	81	123	108	96	54	75	67	89	61	34
West South Central	15	160	78	76	37	107	105	88	41	42
Mountain	94	96	240	78	[10] 123	70	[10] 202	96	[10] 61	70
Pacific	83	216	109	270	113	251	85	210	57	164

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1930, and 1929, respectively.
[2] Barre, Vt., Omaha, Nebr., Winston-Salem, N. C., and Reno, Nev., not included.
[3] Kansas City, Mo., Winston-Salem, N. C., and Reno, Nev., not included.
[4] Newark, N. J., and Reno, Nev., not included.
[5] Barre, Vt., not included.
[6] Newark, N. J., not included.
[7] Omaha, Nebr., not included.
[8] Kansas City, Mo., not included.
[9] Winston-Salem, N. C., not included.
[10] Reno, Nev., not included.

Summary of weekly reports from cities, May 25 to June 28, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

SMALLPOX CASE RATES

	Week ended—									
	May 31, 1930	June 1, 1929	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929
98 cities	16	9	21	8	[2] 13	16	[3] 10	9	[4] 13	15
New England	0	0	0	0	[5] 0	0	0	0	0	0
Middle Atlantic	1	0	1	0	0	0	0	0	[6] 0	0
East North Central	13	15	8	17	11	28	8	18	10	38
West North Central	55	15	116	12	[7] 37	12	[8] 31	6	51	19
South Atlantic	9	0	4	2	[9] 8	4	[9] 2	6	9	2
East South Central	34	7	34	14	40	55	20	0	7	7
West South Central	15	19	22	8	22	42	26	4	22	4
Mountain	60	52	112	52	[10] 26	44	[10] 35	61	[10] 35	113
Pacific	57	27	68	14	57	46	43	31	50	14

TYPHOID FEVER CASE RATES

98 cities	7	7	8	8	[2] 9	9	[3] 8	8	[4] 13	12
New England	11	2	4	7	[5] 9	11	0	4	9	9
Middle Atlantic	3	3	6	5	8	3	4	2	[6] 4	7
East North Central	3	3	4	3	4	4	3	4	10	3
West North Central	9	17	9	8	[7] 6	17	[8] 9	19	13	15
South Atlantic	13	19	20	17	[9] 15	11	[9] 19	13	37	30
East South Central	40	34	13	27	27	34	54	55	67	34
West South Central	22	19	37	27	19	19	26	34	34	34
Mountain	9	0	0	0	[10] 9	9	[10] 9	9	[10] 35	52
Pacific	9	2	2	12	19	19	7	5	5	19

INFLUENZA DEATH RATES

91 cities	4	7	5	7	[2] 7	6	[3] 4	6	[4] 3	5
New England	0	7	0	2	[5] 2	7	2	2	0	2
Middle Atlantic	4	4	4	5	5	4	5	3	[6] 2	4
East North Central	4	9	4	6	6	8	4	8	3	4
West North Central	3	3	12	3	[7] 17	9	[8] 0	6	0	0
South Atlantic	4	6	9	7	[9] 2	2	[9] 2	6	5	4
East South Central	37	0	15	22	15	7	15	15	15	15
West South Central	4	12	11	16	27	12	8	16	11	4
Mountain	17	17	9	35	[10] 0	0	[10] 0	0	[10] 0	44
Pacific	3	16	3	16	6	6	0	6	3	3

PNEUMONIA DEATH RATES

91 cities	80	105	86	90	[2] 85	86	[3] 72	81	[4] 68	64
New England	89	106	73	65	[5] 80	85	69	56	49	58
Middle Atlantic	94	113	106	105	101	98	82	89	[6] 76	65
East North Central	54	101	59	96	67	82	53	76	56	69
West North Central	68	120	130	81	[7] 82	54	[8] 81	48	86	48
South Atlantic	82	112	93	67	[9] 72	88	[9] 64	84	66	62
East South Central	110	112	81	60	110	104	133	119	103	75
West South Central	130	66	84	90	107	62	69	82	92	66
Mountain	77	113	129	61	[10] 88	113	[10] 132	78	[10] 79	104
Pacific	64	63	40	69	71	60	74	104	55	38

[2] Barre, Vt., Omaha, Nebr., Winston-Salem, N. C., and Reno, Nev., not included.
[3] Kansas City, Mo., Winston-Salem, N. C., and Reno, Nev., not included.
[4] Newark, N. J., and Reno, Nev., not included.
[5] Barre, Vt., not included.
[6] Newark, N. J., not included.
[7] Omaha, Nebr., not included.
[8] Kansas City, Mo., not included.
[9] Winston-Salem, N. C., not included.
[10] Reno, Nev., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended June 21, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended June 21, 1930, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia			3			
New Brunswick						3
Quebec	1			1		9
Ontario	6		1		13	10
Manitoba					4	
Saskatchewan	1				10	1
Alberta				1		
British Columbia		6				
Total	8	6	4	2	27	23

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended June 28, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended June 28, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	20
Chicken pox	49	Scarlet fever	7
Diphtheria	26	Smallpox	4
Erysipelas	3	Tuberculosis	32
German measles	6	Typhoid fever	11
Measles	75	Whooping cough	10

DENMARK

Communicable diseases—April, 1930.—During the month of April, 1930, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	9	Mumps	2,234
Chicken pox	62	Paratyphoid fever	7
Diphtheria and croup	381	Poliomyelitis	3
Erysipelas	25	Puerperal fever	25
German measles	51	Scarlet fever	136
Influenza	3,980	Typhoid fever	8
Lethargic encephalitis	9	Undulant fever	35
Measles	2,431	Whooping cough	1,317

PANAMA CANAL ZONE

Communicable diseases—April-May, 1930.—During the months of April and May, 1930, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	April, 1930		May, 1930	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	1	1	3	1
Chicken pox	47		57	
Diphtheria	7		7	
Dysentery (amebic)	6	2	1	1
Leprosy	2			
Malaria	57		293	2
Measles	17		43	1
Mumps	3			
Paratyphoid fever	1			
Pneumonia		16		17
Tuberculosis		28		35
Typhoid fever			1	
Whooping cough	10		10	

PHILIPPINE ISLANDS

Cholera.—During the latter part of May cases of cholera began to occur in the rural districts of the south central part of the Philippine Archipelago, particularly on Negros Island. The rural prevalence of the disease is now rather widespread throughout the involved area, and the principal port of Cebu has become cholera infected. More recently a few scattered cases have occurred adjacent to Manila, following which the chief quarantine officer at Manila has declared a local inter-island quarantine against Cebu. As a precautionary measure, in view of the rural Filipino laborer migration to the Hawaiian Islands and the United States, quarantine was declared on July 7 by the United States against the Philippine Islands, and the quarantine officers at Pacific coast ports, Hawaii, and the Canal Zone have been instructed accordingly.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21	28	July 5, 1930
China:																	
Canton	C									1	1	1		2			
Manchuria—Dairen	C		1														
Swatow	C											3	4	3			
India	C	6,461	5,914	10,817		7,436	15,870	13,209									
	D	3,606	3,371	5,866		4,345	10,403	10,234									
Bassein	C				3	1	1	2	3	4							
	D				2	1	1	1	3	2							
Bombay	C			4													
Calcutta	C	202	269	354	137	165	165	180	194	175	142	98	78	73	94		
	D	110	153	220	85	118	118	93	125	107	83	57	44	36	36		
Negapatam	C	12												1			
	D	4												1			
Rangoon	C	3	3	2				1		5	2	2	1	1	2		
	D	3	1	2				1		1		2	1	1	1		
Tuticorin	C	3															
	D	1															
India (French):																	
Chandernagor	C		4	1	1	2		3	2	2	2						
	D		2	3			4	1	1	4	1						
Karikal	C		4	·12		1											
	D		1	9		1											
Indo-China (see also table below):																	
Pnompenh	C	11	9				2		1				5	10	11		
	D	8	7	6						2	2	1	1	4	7		
Saigon and Cholon	C	2	5	14	17	12	19	28	59	40	48	13	17	19	7		
	D	2	4	6	10	10	13	22	43	27	24	7	11	10	2		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930 12	19	26	May, 1930 3	10	17	24	31	June, 1930 7	14	21	28	July 5, 1930
Philippine Islands:																	
Bulacan Province—																	
Malolos	C												1			1	
	D												1				
Santa Maria	C															1	
Cebu Province—																	
Bantayan	C												3	8	53	86	134
	D												3	7	28	43	8
Barili	C															1	1
	D																1
Bogo	C													1	3	1	23
	D													1	1	1	11
Cebu	C															20	14
	D															9	6
Madridejos	C															15	13
	D															8	5
Medellin	C															1	18
	D																6
Santa Fe	C												1				
	D												1				
Iloilo Province—Miagao	C																1
	D																2
Leyte Province—Maripipi	C													1	15	20	
	D														11	9	
Masbate Province—Cataingan	C															10	20
	D															3	4
Manila	C										1						
Negros—																	
Bacolod	C														9		
	D														8		
Cadiz	C											10	2	10		3	3
	D											7	1	5		3	4
Escalante	C												1				
	D												1				

Hays Calatrava	C														3		
	D														2		
La Carlota	C															3	1
	D															1	1
La Castellana	C															4	3
	D															2	3
Sagay	D																1
San Remigio	C														3	8	38
	D														2	4	8
Talisay	C														7	4	
	D														7	1	
Pampanga Province—																	
Angeles	C														1		
Bacolor	C															1	
Lubao	C																2
Pangasinan: Binmaley	C																2
Rizal—Navotas	C											1					
	D											1					
San Antonio	C													1			
	D													1			
Siam	C	3	7	1	8	7	3		12	4	6			1	6		
	D		4		6	3	2		10	2	2			1	4		
Bangkok	C	3	2	2	1	5	4	5			6	3	5	3	3		
	D			1	1	2	1				2	1		3			
Nagara Pathom	C		1				4	6									
	D		1				2										
On vessel:																	
S. S. at Suva, Fiji Islands	C		1														
S. S. Sutley, at Batavia, from Calcutta	C		1														
S. S. Sassari, at Massoua, from Jeddah	C											1					
	D											1					
On small boat at Port Cebu, from Bantayan Island	C												1				
	D												1				

Place		December, 1929	January, 1930	February, 1930	March, 1930			April, 1930			May, 1930			June, 1-10, 1930
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	
Indo-China (French) (see also table above):														
Annam [1]	C		1	4		52				60		20	3	2
Cambodia [1]	C	41	147	90	49	32		18	6		5	31	52	56
Cochin-China [1]	C	46	177	65	5	22	55	48			188	224	259	147

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21	28	July 5, 1930
Argentina:																	
Andalgala [1]																	
Rosario	C	P															
Santa Fe	C	6															
Villa Lia	D		2														
Azores: Ponta Delgada	C					1	7										
	D						5										
Brazil:																	
Rio de Janeiro	C	1															
	D	1															
Sao Paulo.[2]																	
British East Africa (see also table below):																	
Tanganyika	C		7			11	33										
	D					10	10										
Uganda	C	82	47	98	27	20	23	47	54	89							
	D	70	43	87	27	19	21	38	48	75							
Ceylon:																	
Colombo	C	4	3	4			1		4	1		1	1				
	D	4	3	4			1		3	1		1	1				
Plague-infected rats		1	3	2	2			2					1				
Chile: Antofagasta	C	1	1	1				1									
	D			2				1									
Dutch East Indies:																	
Batavia and West Java	C	167	153	124	27	16	20	24	18	33	17						
	D	164	150	122	27	16	20	24	18	33	17						
Plague-infected rats		3	3	3		6	2				3	2	3	1			
Celebes—Makassar	C	1															
	D	1															
Java and Madura	D	317	296	223	59	40	35	48	28								
Ecuador (see table below).																	
Egypt:																	
Alexandria	C	4	1	4			1	1	2	3	3	5	3	6	6	4	8
	D	1		1			1	1			1	2			2	5	2
Assiout	C						7	7	3	9	2	6	4	2	3		1
	D						3	2		3	1	1		1		2	

Beheira	C	2		4													
Beni Suef	C			4													
Dakahlieh	C		8	5	2		1	2	3	1	2	5	1				
	D			1						1	1						
Gharbieh	C	1					1										
	D						1										
Girga	C				1												
Minieh	C										6	1	1	1	4	4	2
	D											1		1			
Port Said	C				1					1	1		1			1	
Greece (see also table below):																	
Patras	C			1											1		
Piraeus	C	1															
Pyrgos	C			1													
India	C	4,814	5,639	4,087		343	535	420	281	188							
	D	3,308	3,940	3,344		229	517	461	271	205							
Bassein	C	1		3													
	D	1		1													
Bombay	C	1	1	7		4			4	1		1	1		2		
	D	1	1	5	1	3	4		1	4					1		
Plague-infected rats		28	31	86	20	28	25	35	23	39		19	6	7	8		
Madras Presidency	C	27	230	157	12	15	9	8	2						2		
	D	13	140	87	6	8	4	1									
Rangoon	C	3	7	3		3		2		1	3						
	D	2	6	3		2	1	1	1	1	1						
Plague-infected rats		1	7	3	1	2		1	1	3	1				1		
India (Portuguese)	D								7								
Indo-China (see also table below):																	
Pnompenh	C	1			2			1	1			2	6				
	D	2	13	13	2	1	1				1		5	1			
Saigon and Cholon	C	2		1					1				1		1		
	D	2		1													
Iraq:																	
Baghdad	C	6	6	7		2		4	7	11	7	12	12	4	8	4	10
	D	2	1	4				2	3	5	4	6	7	3	5		5
Japan: Osaka (vicinity of)—Plague-infected rats		7	6	4	1	1	1										
Kwang-Chow-Wan	C	25	25	7				37		20		14	23				
Madagascar (see also table below):																	
Tamatave	C					1							1				
Morocco	C	4	48	55	14	41	34	32	19	22	18	12	2		1		
	D		13	18	6	26	12	11	11	14	6	3	4				
Nigeria: Lagos	C	6	7	13					1	1			1		3		
	D	6	7	5					1	1			1		3		
Plague-infected rats		44	42	25	3	3	1		2	6	5						

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.

[2] 21 cases of plague with 8 deaths were reported Jan. 29, 1930, in the State of Sao Paulo, Brazil; 15 of these cases were in the city of Sao Paulo.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930 12	April 19	April 26	May, 1930 3	May 10	May 17	May 24	May 31	June, 1930 7	June 14	June 21	June 28	July 5, 1930
Senegal (see table below).																	
Siam	C	8	17	16	4		1			1	1						
	D	6	13	15	4		2			1							
Bangkok	C		1	5						1	1	3					
	D		1	4						1		3					
Nagara Pathom	C	7	5	1	4	3	2	1									
	D	7	6	1	4	3	1	1									
Nagara Rajsima	C	2	2	1		1											
	D			1		1											
Syria: Beirut	C													2	1	1	
Tunisia:																	
Sfax district	C	18	22				1		17			4	6		3		
Tunis	C	6	5	1				4				1		1			
	D												1				
Union of Socialist Soviet Republics:																	
Saisk Region	C												1			1	
	D												1				
Stavropol Region	C												1				
	D												1				
Union of South Africa:																	
Cape Province	C	1	2	1					P								
	D		1	1													
Orange Free State	C	15	11	5	1												
	D	9	3	3													
Transvaal	C	8	2	1													
	D	3		1													
On vessel:																	
At Rio de Janeiro, Brazil, from Argentina	C	1															

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
British East Africa (see also table above):							
Kenya	C	54	34				
Uganda	C	216	184	109			
	D	199	155	99			
Ecuador: Guayaquil	C	17	4	2	2	0	
	D	6	2	2		0	
Plague-infected rats		13	4	2	2	0	
Ecuador (outside of Guayaquil)	C	19	4				
	D	5	2				
Greece (see also table above)	C	1				1	
Indo-China (see also table above)	C	10	10	30	27	4	
Madagascar (see also table above)	C	264	282				
	D	248	258				
Ambositra Province	C	111	128	49	25		
	D	96	111	41	20		
Antisirabe Province	C	16	26	22	38		
	D	16	25	22	36		
Itasy Province	C	19	31		4		
	D	16	31		4		

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
Madagascar—Continued.							
Miarinarivo Province	C	3		25	14		
	D	3		25	14		
Moramanga Province	C	12	22	7	5		
	D	12	21	4	5		
Tamatave Province	C	2	3				
	D	2	1				
Tananarive Province	C	97	88	110	52		
	D	98	83	107	52		
Senegal:							
Baol [1]	C	5			18	24	13
	D	2			8	12	11
Dakar [1]	C	8				2	52
	D	1				2	42
Louga [1]	C			2		33	54
	D					10	27
Thies [1]	C		3		3	12	21
	D				2	9	8
Tivaouane [1]	C		1		11	71	135
	D				8	38	69

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21	28
Algeria:																	
Algiers	C		6	1	5	1					1		2				
Constantine	C		1													1	
Oran	C		5		1												
Arabia: Aden	C	1	1	2	3			1									
Bolivia: La Paz.[1]																	
Brazil: Rio de Janeiro	C	1															
British Borneo: Sarawak	C		4	19													
British East Africa (see also table below):																	
Tanganyika	C	27	5	49	103			26	31	33	45	55					
	D	5		8	7			10	4	3	5	8					
British South Africa:																	
Northern Rhodesia	C				9				1								
	D								2								
Southern Rhodesia	C	33	1	6				66		53		42					
	D	6						1		4		8					
Canada:																	
Alberta	C	16	22	4	10	3	1										
Edmonton	C	15	19	1	4	3											
British Columbia—Vancouver	C	17	16	16	20	8	1	5	3			2	2	1	1		
Manitoba	C	8	6	2	4	2			2			7	3			4	
Ontario	C	51	63	86	100	17	30	18	12	14	24	24	20	14	10	13	10
Fort William	C		4														
North Bay	C		2	1						1							
Ottawa	C	7	10	11	19	8	4	7	2	3	10	7	5	6		8	1
Toronto	C		2									3	1	2	1	1	
Quebec	C	3	11														4
Montreal	C		1														
Saskatchewan	C	61	86	76	47	3	10	7	21	20	6	10	3		12	10	
Regina	C	31								1		3					
Ceylon:																	
Angoda, Western Province	C			10					6								
	D			1					2								
Colombo	C	1	1	3													
	D			2													

China:																	
Canton	C	5	7	11	6		2	1						1			
	D		2	3	2	1	1		1								
Chungking	C	P	P	P		P	P	P	P	P							
Foochow	C	P	P	P			P		P		P		P				
Hong Kong	C	102	118	62	38	20	7		1	5	5	2		2	1	1	
	D	73	109	51	25	11	9	3		4	2	3		1		1	
Manchuria—																	
Harbin	C	1	3				1				10	10					
Kwantung—Dairen	C	1	6	5			1		1	1		7			11	5	
	D											4				1	
Nanking	C	P	P	P	P	P			P	P			P	P			
Shanghai—																	
Foreigners only	C	7	5	2	2	2	1				1	1		1	1	1	2
Including natives	D	6	8	7	10	4	3	2	1		1	2	2	1		1	
Swatow	D	2	3	6	6	2			1	1		1	4	1			
Tientsin	C	2	1	1	2	1			1	1							
Chosen (see table below).																	
Colombia:																	
Baranquilla	C	1		102	2	1											
Buenaventura	C	13		1		7	5	2	1	2		1	1	1	1		
Costa Rica:																	
Port Limon	C					1	1	2	2				2	2			
San Jose [2]	C				10	7											
Curacao (alastrim)	C				14			1	1	2					1		
Dahomey (see table below).																	
Dutch East Indies:																	
Belawan Deli	C	1															
Borneo	C		1		185	17	43	20	10		10	4					
	D		1		12	16	12	2	1	1							
Java—																	
Batavia and West Java	C	17	14	14	78	30	25	8	1	1		5	1		1		
	D	10	7	7	6	6	1	3	1	1		3	2		1		
East Java and Madura	C							4									
Sanggi Islands	C	17	25	12	5		43		66	14	12						
	D	3			1		2		13	1	4						
Sumatra	C	1	2		48												
	D				5												
Egypt: Port Said	C		2			1					1						
Great Britain:																	
England and Wales	C	1,005	1,455	1,530	1,700	423	345	353	306	462	324	304	327	237	266		
Ashton under Lyne	C	3	4	29	15	9	3	4	2	6	3	4	4				
Bradford	C	8	5	2		1			2		1		1				
Cardiff	C				2	1	2										
Leeds	C		6	11	16	1	1										
London	C	480	597	699	710	169	169	129	137	222	138	148	129	130	136		
London and Great Towns	C	799	1,101	1,156	1,239	308	264	265	229	339	250	235	254	197	208		
	D		2	5	3	2	1	1									
Sheffield	C				8	1	1										
Stoke-on-Trent	C	12	12	41	122	17	23	33	12	19	9	13	21	3	10		
Scotland	C													1		3	

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21	28
Greece: Patras	C	1															
Hedjaz	C	11	11														
India	C	12,789	26,524	36,036	39,329		7,786	8,385	8,353	6,533	6,549						
	D	3,730	6,186	7,710	9,109		1,543	1,779	1,597	1,449	1,814						
Bombay	C	119	342	638	718	143	114	89	84	52	68	58	40	36	35	23	
	D	57	164	314	431	88	78	64	44	33	49	44	35	27	23	19	
Calcutta	C	88	185	399	361	153	116	122		109	70	52	71	56	45	45	
	D	62	130	287	305	124	97	103		94	72	40	52	50	37	29	
Cochin	C	234	234	184	291	56	49	58	20	13	8	7	9	4	1		
	D	20	27	29	35	3	4	6	2	5	1	2		2	1		
Karachi	C	17	30	38	33	10	9	7	4		6	7	1	5		1	
	D	11	9	16	47	10	3	2	2	2		1	1	2		1	
Madras	C	85	105	159	173	55	26	27	25	24	13	15	20	9	10	8	
	D	16	16	29	36	6	6	5	10	4	5	6		6	3	1	
Moulmein	C	18	65	143	146	10		33		27	29	20	13		9	6	
	D	9	18	40	41	4		3		4	6	5	6		3	3	
Negapatam	C			1								1			1		
Rangoon	C	2	7	7	10		1	1	2	2		3	1	1	5	1	
	D		4	2	5					1						1	
Tuticorin	C		3									5					
Vizagapatam	C	2	5	9	69	1		2	3	3	1	1			1		
	D			1	18	1			1		3						
India (French):																	
Chandernagor	C		3	11	6	4		6		6	2	8	8	4			
	D			5	2			2		2	4	1					
Karikal	C		3	12	24	8	9	2		6	5	1		4	3		
	D		3	8	7	3	3	2		2	1			2	2		
Pondicherry Province	C	20	22	52	21	12	1	11		9	13	10	8	4			
	D	19	19	40	13	11	1	8		7	12	10	7	4			
India (Portuguese)	C		16	50	38	5	6	15	17	2	27	5	13				
	D			6	2			5	3		3	1	4				
Indo-China (see also table below):																	
Pnompenh	C									1		1	1				
	D		1				1	1						1			
Saigon and Cholon	C	4	3	4	3			4	1	1	1			1			
	D	2	3	2	1		1	3	1		1		1				

Iraq:																	
Baghdad	C	16	7	3		1	2	3	2	1				1			
	D	5	3	1					1	1							
Basra	C			1					1								
Mossoul Liwa	C	80	26	12			22			13		8			1		
	D	3	7	2			3			2		1			1		
Ivory Coast (see table below):																	
Jamaica	C												2				
Japan: Tokyo	C								1								
	D								1								
Macao	D			2	3	1			1	1							
Mexico (see also table below):																	
Jalisco (State): Guadalajara	D	9	9	14	22	6	4	8	2			6	1	4		5	6
Juarez	C	3	2	3	2												
	D	2	1	1													
Mexico City and surrounding territory [3]	C	25	30	38	106	36	19	20	24	30	15	17	18				
	D	4	7	21	31	14	8	14	11	6	12	8	6				
Morelos State.[4]																	
Progreso	C											1					
	D											1				1	
San Luis Potosi	C			1													
	D			1													
Morocco (see table below).																	
Netherlands: Rotterdam	C	1															
Nigeria (see also table below): Lagos	C	2	5	2	1	1											
	D	1	2														
Persia (see table below).																	
Philippine Islands: Sarangani and Balut Islands [5]	D	40	18	3													
Poland	C	2		2				2	5		1		2				
Portugal: Lisbon	C	6	4	7	7	2	3	3		6		2		1			
Rumania	C		1	1	2												
Siam	C	42		2		2	2	2	2	2							
	D	9	1				2	2									
Somaliland, British: Boales	C	5	35	19	2												
	D	9	8	2	6												
Spain	C														4		
Straits Settlements	C		2		5	2	1		2	1	3	2	5	5		1	3
	D		1		1	1			1		1	1	1	1		1	
Sudan (Anglo-Egyptian)	C	290	230	79	60	2	9	31			5	13	1	4	8	1	54
	D	65	34	6	5	1		3				1	1				3
Sudan (French) (see table below).																	
Syria (see table below).																	
Tunisia: Tunis	C	20	7	3	3			1	3		1		1			2	
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P	P		P		P	P	P					
Orange Free State	C	P	P	P	P												
Transvaal	C	P	P	P	P												
Upper Volta	C			26	2	2		1					1				

[3] During the month of March, 1930, 100 cases of smallpox were reported in Mexico City, Mexico, and surrounding territory.
[4] Newspaper reports of Feb. 4 show an epidemic of smallpox in Ionacatepec, Morelos State, Mexico, and vicinity, giving 600 deaths in preceding 2 weeks.
[5] On Feb. 1, 1930, 317 cases of smallpox with 102 deaths were reported to that date in the Sarangani and Balut Islands.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21	28
Zanzibar	C				13												
On vessel:																	
S. S. Tairoa, at Liverpool, from London	C			1													
S. S. Karagola, at Zanzibar, from India	C		4														
S S. Karagola, at Lourenco Marques, from India	C			1													
S. S. Elysia, at Port Sudan, from Bombay	C						1										
S. S. Naldera, at Port Said	C									1							
S. S. Manoa, from Honolulu to San Francisco	C																1

Place		December, 1929	January, 1930	February, 1930	March, 1930: 1–10	11–20	21–31	April, 1930: 1–10	11–20	21–30	May, 1930: 1–10	11–20	21–31	June 1–10, 1930
Belgian Congo	C	74												
	D	4												
Dahomey	C	19												
Indo-China (see also table above)	C	142	460	434			26	261				173	132	80
Ivory Coast	C					7								
Sudan (French)	C	17	229	213		200	409	371		150	40	56	178	
	D		25	11		18	31	30		6	7	7	18	
Syria: Beirut	C	25	70	18	4	8	5	10	2	7				6
Taiwan: Taihoku	C			43	31	12	15	10	2					

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
British East Africa (see also table above):							
Kenya	C	168	12	12	175	174	
Chosen	C		1	4		5	
	D			1		1	
France	C	9	9	23	8		3
Mexico: Durango (see also table above)	D	4	12	6	5	4	4

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
Morocco	C	84	29	74		10	18
Nigeria	C	293					
	D	70					
Persia	C	P					
Turkey	C	883	215	114		3	16
	D	457	66	42			

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	April 19	April 26	May, 1930: 3	May 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21	June 28	July 5, 1930
Algeria:																		
Algiers	C	14	3	4	6	2	3	2	1	1	2	4	8	2		1		
Constantine Department	C	2	4	5	11	4	9	2			4		2	11		1		
Oran	C		2										3					
Arabia: Aden	C				1													
	D				1													
Bolivia: La Paz.[1]																		
Brazil: Porto Alegre	C	1		2						1								
Bulgaria	C	41		13	9	15				1		5		1		9		
	D	2		1		1				1				1				
Sofia	C		1															
Chile:																		
Talcahuano	D		1															
Valparaiso	C		1															
China:																		
Manchuria—Harbin	C			1	4	5		20	27									
Shanghai	C				1													
Tientsin	C	1	1															
Chosen (see table below).																		
Czechoslovakia (see table below).																		

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930			May, 1930					June, 1930				July 5, 1930
						12	19	26	3	10	17	24	31	7	14	21	28	
Egypt:																		
Alexandria	C							1								1		1
Assuan	C	9																
	D	1																
Beheira Province	C	7	14	18	2			2		9	21	9	10	17	16	7		9
	D			5						4	4	4	1	1	1			1
Cairo	C			1														
Dakahlieh	C	11																
	D	2																
Port Said	C		2	1														
Suez	C		1															
Great Britain: Scotland—																		
Glasgow	C										1							
	D										1							
Greece (see table below).																		
Iraq: Baghdad Liwa	C	1			2													
	D	1																
Ireland:																		
Irish Free State	C	1																
Ballina—Mayo County	C												2		1			
Dingle—Kerry County	C							3	2									
Shillelagh—Wicklow County	C														1			
Swinford—Mayo County	C										7	7						
Northern Ireland—Cookstown	C			3														
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico: Mexico City, including municipalities in Federal District	C	6	12	9	4	2	1		1		2		4					
	D	2	4		1	2	1		1				3					
Morocco	C	6	23	21	38	6	5	3	1	3	6	1	1	1		6		
	D				7	2	1											
Palestine	C			1	6		1				2			2				3
Poland	C	61	296	183	228	59	64	53	67	64	45	34	28			26		
	D	4	21	8	13	4	2	3	6	2	2		1			2		

Portugal:																		
Lisbon	C								4									
Oporto	C			1	2	1												
Rumania	C	82	241	293	185	71	46											
	D	5	25	23	12	1	9											
Spain: Valencia	C														2			
Tunisia	C	2		3						2	2	1	1			2		
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P			P	P	P						
Natal	C	P	1	3	P	P	P	P		P	P							
Orange Free State	C	P	P	P	P					P	P	P						
Transvaal	C					P	P	P										
Yugoslavia (see table below).																		

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
Chosen: Seoul	C	1		17		3	
Czechoslovakia	C		10	2	42	29	
France	C	1					
Greece: Athens	C	6	12	6	3	1	
Latvia	C	2	18				
Lithuania	C	5	2	70	62	73	27
	D	1		5	4	4	
Turkey	C	4	2	3	1	3	16
Yugoslavia	C	6	26	33	46	22	16
	D	1	3	5	2	4	1

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Brazil—Continued.	
Gold Coast, Dec. 21, 1929	1
Gold Coast, July 10, 1930	1
Liberia, Monrovia, June 3, 1930	1

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PHARMACOLOGICAL AND CHEMICAL STUDIES OF THE CAUSE OF SO-CALLED GINGER PARALYSIS

A PRELIMINARY REPORT[1]

By MAURICE I. SMITH, M. D., *Senior Pharmacologist*, and E. ELVOVE, Ph. D., *Chemist, National Institute of Health (Hygienic Laboratory) United States Public Health Service*, with the cooperation of P. J. VALAER, Jr., William H. FRAZIER, and G. E. MALLORY, *Chemists, Prohibition Bureau*

A peculiar form of paralysis, perhaps unlike anything ever known before, has recently afflicted a relatively large proportion of the population throughout some of the midwestern and southwestern States. Definite figures on the extent of the disease are not available, but it is certain that the numbers run into the thousands. An investigation of this condition in some of the stricken areas in Ohio and Tennessee seemed to confirm the widespread rumor that the disease is closely associated with the drinking of an adulterated fluid extract of ginger. That it could not be due to the ginger as such became clearly evident from the fact that many of the victims, when questioned, freely admitted having used similar preparations for beverage purposes for from one to five years with no other effects than those derived from the alcohol. It soon became evident, therefore, that the condition must have resulted from some unknown poison or from some known poison whose pharmacologic action was so altered through the ginger or the alcohol, or both, as to render it unrecognizable, which poison in some way got into a manufactured lot of so-called U. S. P. fluid extract of ginger at a relatively recent date.

EPIDEMIOLOGY

It must be borne in mind that the so called U. S. P. fluid extract of ginger has been sold extensively for many years for beverage purposes, mostly and perhaps exclusively throughout the States where the paralysis is prevalent at present. This seems to have followed the ruling of the Prohibition Bureau to the effect that the

[1] Presented at the Twenty-eighth Annual Conference of State and Territorial Health Officers with the United States Public Health Service, Washington, D. C., June 18, 1930 (held jointly with the Forty-fifth Annual Conference of State and Provincial Health Authorities of North America).

official fluid extract of ginger is a nonpotable beverage, thus removing all restrictions from the sale thereof. Following this, it appears, there soon came upon the market what seems to have been in effect a tincture of ginger adulterated with substances not easily detectable by the chemist and resembling oleoresin of ginger to make it conform with the official fluid extract. Such a preparation has been used very widely as a beverage in the States alluded to.

The close relationship of the disease to the consumption of an adulterated fluid extract of ginger is clearly brought out by the epidemiological studies at the Cincinnati General Hospital by Dr. T. J. LeBlanc, to whom we are greatly indebted for this information. Briefly, Professor LeBlanc's studies indicate that the cases of paralysis, of which they had over 200, first began to show up the latter part of February, that the epidemic reached the peak by the middle of March, and that by April it was well on the decline. Almost exactly the same data were obtained in an epidemiological study by the Tennessee State health department, at Nashville, of 119 cases that occurred for the most part in eastern Tennessee. Both epidemiological studies agree in that the great majority of the patients were males, that it affected all ages between 20 and 80 years, usually about 40, that no cases occurred among children and very infrequently among young adults, and that practically in all cases a history of drinking ginger could be obtained. Another significant fact disclosed by these investigations was that an interval usually of from 10 days to 3 weeks elapsed between the drinking of the suspected ginger and the onset of paralysis. These findings were confirmed by one of us (M. I. S.) by a personal examination early in May of six cases in Ripley, Ohio, and eight cases, including one lawyer and one retired merchant, in Johnson City, Tenn.

Bearing in mind that the "epidemic" first occurred the latter part of February and that there was on an average an "incubation period" of two weeks, it appeared clear that the poisoned ginger must have been shipped for distribution from its source of manufacture (which no one knows) early in February or possibly during the month of January. Furthermore, since the ginger was sold in and about Cincinnati under at least eight different brands and in Johnson City under at least four different brands, and since in no case could paralysis be definitely associated with or definitely dissociated from any one brand, it appears probable that the poisoned "fluid extract" of ginger must have come from some one source at a fairly definite time. The evidence which will follow bears out these early assumptions.

SYMPTOMATOLOGY AND CLINICAL FINDINGS

There is a remarkable uniformity in the history and the symptoms and physical signs. In every case investigated there is a clear history of drinking "U. S. P. fluid extract" of ginger purchased from a local dealer (not from a pharmacist) who distributed the ginger in 1½ or 2 ounce bottles. The brands were different according to the locality sold; Anchor, Peer, Royal, K. D., K. K., Q. C., B. & L., Fulton, Tommac, Deco, Uanaca, and Land were some of the brands drunk by many of the victims questioned. A noteworthy point is the fact that apparently the quantity consumed was not a deciding factor in the outcome, except perhaps in degree. Apparently reliable histories have been obtained indicating that one drink of as little as 1 ounce of the ginger produced essentially the same result, except perhaps for some differences in degree, that followed the drinking of 10, 15, or more 2-ounce bottles over a period of some days. The immediate effects in many cases were none other than those of alcoholic intoxication. In many of the cases there were gastrointestinal disturbances characterized by nausea, vomiting, abdominal pain, and diarrhea. These lasted a day or two. The gastrointestinal disturbances seem to have had no relationship to the brand consumed nor to the ultimate outcome, for fairly definite histories were obtained where two or more in a party drank of the same purchase lot with the early symptoms in some and no immediate effects whatever in others, but with ultimate paralysis in all.

With the exception of the early and transient gastrointestinal disturbances in some of the cases, no effects were noted that could have been definitely attributed to the consumption of the beverage for an interval of from 5 days to 3 weeks, usually about 10 days. The first symptoms were soreness in the muscles of the legs, and only occasionally some numbness in the fingers or toes. The soreness of the leg muscles was usually complained of for several days before it was realized that the toes could not be moved. This was soon followed by bilateral foot drop. In all the cases questioned the onset of the weakness in the fingers and the wrist drop followed the foot drop by an interval of about a week or 10 days, and, upon examination, the disability in the hands and forearms was never so marked as in the feet and legs.

Clinically the victims presented bilateral wrist drop and foot drop of varying degrees of severity. The milder cases could get about with the aid of canes or crutches; the severer cases were bedridden and in many instances were unable to feed themselves. The paralysis in the upper extremities has not been seen to extend beyond the elbows, and in the lower extremities the thigh muscles were seen to be involved in the more advanced cases. There are no sensory

disturbances, no impairment of tactile, pain, or temperature sensations; the superficial reflexes are normal; the sphincters are normal; there are no visual disturbances; and there is no evidence of involvement of the cranial ganglia or nerves. In brief, the clinical picture is uniformly that of a flaccid paralysis for the most part of the distal muscles of the lower and upper extremities, clearly pointing to involvement of the lower motor neuron remarkably localized to the lower lumbar and lower cervical regions of the cord. Indeed, the only physical sign that in our experience presented any degree of inconstancy is the knee jerk, which has been found diminished or absent in the severer cases, as one would expect, normal or nearly normal in the milder cases, and markedly exaggerated in some of the milder ambulatory cases.[1]

THE PROBABLE NATURE OF THE POISON

From the description of the clinical manifestations of the disease considered in the light of the probable etiologic factor it must be evident at once that this form of motor paralysis does not fit in with the known types of multiple peripheral neuritis. It will be readily conceded that it is not pure alcoholic multiple neuritis. Its superficial resemblance to arsenical neuritis has led some observers to suggest arsenic in the ginger as the etiologic factor of this disease. The fact that none or only a trace of arsenic, such as one part per million to one part per ten million, has been found in numerous samples of ginger examined should be sufficient to render untenable the arsenic theory. If by some remote chance the implicated ginger which, for the sake of argument, escaped the chemists' notice, became heavily contaminated with arsenic, large doses of the ginger, which many victims admit having drunk, should certainly have resulted in some deaths with clinical manifestations of arsenic poisoning other than the paralysis. Lastly, the absence of sensory disturbances, cutaneous and other clinical manifestations characteristic of arsenic neuritis must be quite sufficient definitely to eliminate arsenic as the etiologic factor.

By a similar process of reasoning, lead and other heavy metals may be eliminated from the discussion, since no appreciable amounts of lead or other poisonous metals have ever been found in any of the suspected samples of ginger, nor have any of the patients shown any clinical symptoms of lead poisoning other than the paralysis.[2]

We are thus left with two possibilities which merit consideration: Either a shipment of ginger root, imported through other than the

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[1] A splendid description of the clinical picture with reports of cases of "ginger paralysis" is given in recent publications by C. R. Bennett (1) and S. Harris (2).

[2] Very careful chemical examination of the urine and feces for lead by Doctor Kehoe in a series of ginger paralysis cases at the Cincinnati General Hospital gave completely negative results. Similar studies for arsenic have likewise yielded negative results. Personal communication.

regular channels, was contaminated, probably through carelessness or ignorance or both, with a root resembling ginger superficially but having remarkable pharmacologic properties of affecting the peripheral motor nerves in selected areas; or some known poison or derivative thereof got into a manufactured lot of the ginger beverage, accidently or in some other manner, and its pharmacologic properties were so altered through the ginger or alcohol, or both, so as to be no longer recognizable. In favor of the first alternative there is some information to the effect that an obscure paralytic disease of livestock, known among the natives as "derringada," occurs in some parts of South America. The plant that is probably responsible for this, and known as "derringue" or "jaqua," appears to be a tree, and it is not clear how this could be confused with ginger root. There is also a plant in Porto Rico and Cuba that has a reputation of being poisonous to cattle, commonly known as "Tibey" and scientifically as *Isotoma longiflora*.[3] From a paper by Plugge (3) on the toxic action of the alkaloid of this plant, isotomin, it appears that the toxic nature of the plant is such that it could not possibly account for the clinical picture of paralysis that the ginger has caused in man. Furthermore, the results of our pharmacological studies with the suspected ginger, in animals, which will be detailed below, pretty well eliminate *Isotoma longiflora* as the offending agent and also probably eliminate to a large extent, though not completely, the possibility of other rare plants that might bear an unknown and specific poison.

We must now consider the other possibility of some known or only partially known poison with its pharmacologic properties so altered as to produce a condition in man heretofore virtually unknown. From the very nature of the problem it would seem not improbable that the suspected ginger contained some denaturant, since denatured alcohol might very well have been and probably was used in the manufacture of some of the beverage, or that it contained some adulterant, since it is known with certainty that adulterants of various kinds have been used for several years in the manufacture of the ginger beverage. In the following we submit chemical and pharmacological evidence which, though by no means complete, seems to indicate that the latter explanation appears to be indeed the correct one, though the mechanism of action of the suspected and partially identified adulterant is as yet not clear.

PHARMACOLOGICAL AND CHEMICAL EVIDENCE

Through a careful and painstaking search for samples of ginger in any way related to the epidemic, we succeeded in securing 13 such samples, a brief description of which is given below.

[3] Personal communication from Dr. D. H. Cook, acting director, School of Tropical Medicine, San Juan, P. R.

1. Hub Distributing Co. Seized by prohibition officers April 17 in a warehouse where it was stored in bulk.

2. Queen City brand. Seized by prohibition officers. This was bottled in 2-ounce bottles.

3. Davis & Co. Seized by prohibition officers. Bottled as above.

4. Davis & Co. Shipped in bulk to H. C. Guernsey, Seminole, Okla., who drank of it and developed paralysis.

5. Queen City brand, bottled. A shipment to a dealer in Johnson City, Tenn., under date of January 18 and seized by the local prohibition officer.

6. Same as above. Shipped under date of February 18.

7. Same as above. Shipped under date of February 24.

8. Small sample, about 50 c. c. Q. C. brand obtained from the commanding officer, Soldier's Home, Johnson City. This was a sample of a lot that is said to have produced paralysis in some of the inmates.

9. Sample similar to above, Land brand, said to have been drunk by some of the inmates with no ill effects.

10. A sample of B & L received from Dr. W. M. Simpson, Miami Valley Hospital, Dayton, Ohio. This represented part of several 2-ounce bottles consumed by a patient of Dr. G. P. Tyler, jr., of Ripley, Ohio, resulting in paralysis.

11. A sample of B & L obtained from Dr. G. P. Tyler, jr., of Ripley, Ohio, who is fairly certain it produced paralysis.

12. A sample of Peer brand obtained from Doctor Tyler as probably harmless.[4]

13. A sample of B & L obtained from a colored resident in Ripley with the assurance that a friend had acquired paralysis from drinking several bottles of similar material.

It will be seen that of these 13 samples, Nos. 4, 8, 10, 11, and probably 13 may be considered as almost certainly paralytic, while Nos. 9 and 12 as almost certainly harmless. The others may be said to be uncertain with the exception of Nos. 5, 6, and 7, which from the epidemiological evidence of the prevalence of the disease in eastern Tennessee, and especially in Johnson City, would make it appear very probable that No. 5 would be the most likely and No. 7 the least likely shipment to have caused paralysis.

The chemical evidence of a positive nature which we have secured concerns the test for phenols which, so far, has resulted positively in the cases of all specimens of ginger that have caused paralysis either definitely or with a high degree of probability, and negatively in the

[4] Ripley has a population of about 1,500 with over 100 cases of paralysis, according to Dr. G. P. Tyler, jr.

cases of ginger preparations that were definitely or probably harmless. The test for phenols was carried out as follows:

Five c. c. of the sample was placed in a 250-c. c. distilling bulb. It was made alkaline by the addition of 25 c. c. N/10 NaOH, and 20 c. c. of distillate was collected. The residue in the flask was then diluted with 10 c. c. of distilled water and acidified by addition of 10 c. c. N/1 H_2SO_4. It was again boiled and 20 c. c. of distillate collected. Ten c. c. of the latter distillate, after mixing, was tested for phenols by treating with 5 c. c. of Millon's reagent.[5]

The pharmacologic evidence supporting and supplementing this chemical finding is shown by the experiments upon rabbits, wherein every sample of ginger giving a positive test for phenols has produced upon oral administration a symptom complex characterized by muscular tremors, hyperexcitability, spastic rigidity, followed by general muscular weakness, and generalized flaccid paralysis of all the extremities and finally death from respiratory failure. The condition produced in rabbits by the suspected ginger may be briefly described as that resembling systemic phenol or cresol poisoning, with the difference that the stimulating action upon the spinal cord was somewhat more pronounced than with pure phenol or tricresol in alcohol similarly administered, the end result, however, being the same in all cases—viz, generalized flaccid paralysis for several hours or days preceding death due to respiratory failure.

TABLE 1.—*The presence of a phenolic compound in certain adulterated fluid extracts of gingers, its close association with paralysis in man, and phenol-like toxicity in rabbits.*

Sample No.	Paralysis in in man	Phenol reaction	Pharmacologic action in rabbits			
			Number of rabbits	Total dose administered		Result
				Minimum	Maximum	
				C. c. per kilo	*C. c. per kilo*	
1	Not known	Positive	9	6	24	All died with typical symptoms.
2	do	Negative	5	30	48	Survived. No symptoms.
3	do	Positive	2	12	24	Died with typical symptoms.
4	Paralytic	do	2	12	18	Do.
5	Probably paralytic.	do	2	25	40	Do.
6	Doubtful	do	2	8	12	Do.
7	Probably not	Negative	2	64	64	Survived. No symptoms.
8	Paralytic	Positive	(a)			
9	Harmless	Negative	(a)			
10	Paralytic	Positive	1	12		Died with typical symptoms.
11	do	do	1	12		Do.
12	Probably harmless.	Negative	(a)			
13	Paralytic	Positive	(a)			

[a] Insufficient for pharmacological test.

[5] The Millon reagent was prepared and the test carried out in accordance with the directions given in Hygienic Laboratory Bulletin No. 110, pp. 25-33 (1917).

These preliminary findings are given in Table 1. The data therein are self-explanatory and require but little comment. The ginger was administered to the rabbits by stomach tube after dilution with water so that the alcohol concentration was about 25 per cent. Eight c. c. per kilo of 80 per cent alcohol is close to the maximum tolerated dose in the rabbit; hence the amount of ginger administered at any one time never exceeded this, and only the nontoxic gingers were administered in such large daily doses. The toxic gingers were administered in daily doses of from 2 to 6 c. c. per kilo until definite symptoms of tremors or spastic rigidity developed, when the treatment was generally discontinued.

Summarizing the results detailed in Table 1, it appears that samples of ginger which were definitely or probably paralytic in man gave a positive reaction for phenols and produced in relatively small doses a phenol-like symptom complex in rabbits terminating in medullary paralysis, while ginger samples that in so far as we know were harmless in man, gave no such phenol reaction, and had no toxic effects in rabbits when administered in moderately large doses.

THE PROBABLE NATURE OF THE PHENOLIC COMPOUND

Important information on this phase of the problem was gleaned from some experiments on monkeys and dogs. At the very outset it was felt, for obvious reasons, that the monkey would probably be the most useful experimental animal in this problem. Contrary to expectations, however, it was found that no symptoms of any description other than those produced by the alcohol could be elicited from the oral administration of the suspected gingers. If the ginger was administered daily, there soon developed a tendency toward vomiting. When administered every other day, the animals generally tolerated it well. The gingers were given in doses of 8 to 10 c. c. per kilo, or the equivalent of the maximum tolerated dose of alcohol. To our great astonishment, not the slightest symptoms could be elicited. The same results were noted in several experiments upon dogs.

Table 2 is presented to show the peculiar and almost absolute immunity of the monkey to the phenolic substance demonstrated in the suspected gingers. Only a few of the most striking experiments are given in this table, which, however, show sufficiently conclusively that for some, at that time, obscure reason the monkey was extremely refractory.[6]

[6] There was one exception to this in the series of 17 monkeys used in this work: Monkey No. 3, weighing 3.2 kilos, developed what appeared to be a typical case of flaccid paralysis of the upper and lower extremities within two days of the oral administration of two doses of 5 c. c. per kilo of ginger (sample No. 1). This condition lasted for about 10 days and was followed by nearly complete recovery. The animal was then given several more doses of 8 c. c. per kilo of the same material, but failed to show anything further. We have never known how to explain this apparent exception and the failure to reproduce the condition in the same animal with the same material.

TABLE 2.—*Comparative effects of suspected ginger in monkeys and rabbits*

Sample No.	Phenol reaction	Monkey No.	Weight, (kilograms	Total dose (c.c. per kilo)	Result	Effect in Rabbits
1	Positive	1	4.0	89	No effect	Killed rabbits with typical phenollike symptoms in doses of from 6 to 24 c. c. per kilo.
		2	3.3	49	do	
		4	3.2	42	do	
5	do	15	3.3	42	do	Killed in 25 to 40 c. c. per kilo.
6	do	11	3.0	56	do	Killed in 8 to 12 c. c. per kilo.
11	do	8	3.0	40	do	Killed in 12 c. c. per kilo.
4	do	17	3.4	72	do	Killed in 12 to 18 c. c. per kilo.

It was thought that the immunity is only a relative one, and by concentrating the ginger through the removal of alcohol it might be possible to elicit some symptoms upon the administration of relatively large doses.

Experiments were therefore performed in which the alcohol and water were removed with the greatest care to avoid as much as possible the chemical breakdown of the constituents of the "fluid extract," and concentrates, the equivalent of 500 to 1,000 c. c. of sample No. 1, were administered. There were no effects either immediate or remote.

These negative experiments then made it appear likely that the substance in the suspected ginger which is toxic in rabbits and which may or may not be identical with the substance which produced paralysis in man is in some peculiar combination, so that it can not exert its action in the monkey. Experiments were then made in an attempt to recover the suspected material by fractional distillation. A liter of ginger (sample No. 1) was freed of alcohol and water and subjected to partial vacuum distillation. A small amount, about 2 c. c., of volatile oil came over at a temperature below 195° C. This material injected intramuscularly into a monkey had no effect. On further distillation a considerable amount, about 10 c. c., came over at a temperature of from 195° to 205° C. This was followed by a drop in temperature suggesting decomposition, then another distillate of a few cubic centimeters was collected at 100° to 160° C. The last two fractions gave a strongly positive Millon reaction for phenols. The two distillates were injected intramuscularly into monkey No. 10. In about 15 minutes there were typical symptoms of systemic phenol poisoning, with fine and coarse muscle tremors, loss of reflexes, and coma. The animal recovered within 18 hours, but showed pronounced flaccid paralysis of the extremities, with great difficulty of locomotion. This condition persisted for three days, when the animal died. The histologic findings of this and many other animals that came to autopsy in this work will be reported later if the results so warrant.

This experiment was repeated with essentially the same results in monkey No. 20, which likewise developed a flaccid motor paralysis

of the upper and lower extremities. In this case the material recovered from 1,000 c. c. of the same ginger was injected subcutaneously and intramuscularly in divided doses over a period of five days so that acute symptoms of phenolic poisoning were never elicited. The paralytic symptoms developed on the fourth day following the first injection and lasted five days, when death supervened. Control experiments on monkeys with similar fractions obtained from U. S. P. ginger or adulterated ginger not giving the phenol reaction (ginger No. 2) gave negative results.

These experiments on monkeys taken in conjunction with the earlier negative ones clearly verified our assumption that the phenolic compound in the suspected ginger must be an extremely stable substance, resisting decomposition in the body of the monkey or dog and, therefore, harmless. These experiments further suggested another line of investigation with the aim of using more drastic chemical treatment but at lower temperatures, whereby more complete decomposition of the phenolic compound could be effected without at the same time obtaining organic decomposition products as the result of the high temperatures.

The following procedure was then adopted. Four hundred c. c. of the suspected ginger (sample No. 1) was carefully freed of its alcohol and water. The residue was acidified with H_2SO_4 and extracted with ether. The ether extract [7] was treated with 25 c. c. of a 25 per cent solution of NaOH at room temperature to remove resin acids and free phenols if present. Subsequent acidification of this aqueous solution and distillation showed, however, that there were no free phenols. The ether extract was freed of its ether and the residue saponified with 25 per cent NaOH at 100° C. for 1 to 2 hours. This was then acidified with H_2SO_4 and distilled, whereupon phenols (probably cresols) were recovered in amounts corresponding roughly to about 1 per cent of the suspected ginger. The chemical work on the identification of the phenols is still in progress. The pharmacologic evidence, however, seems conclusive, for the oral administration of this material in alcohol, divided in two doses produced in a monkey (No. 14) the immediate effects of systemic phenol poisoning, including generalized muscular tremors, muscular weakness, and coma, followed by complete recovery within 24 hours. Indeed the symptoms were identical qualitatively with those produced by the administration of 5 c. c. per kilo of a 5 per cent phenol solution in 95 per cent alcohol.

The exact nature of the phenolic compound which we have found uniformly to be present in suspected ginger and absent in unsuspected ginger is as yet unknown. From its chemical behavior it appears to

[7] In one experiment the ether extract representing 2,000 c. c. ginger was evaporated at this point, residue treated with H_2SO_4, and distilled, whereupon 4 c. c. of volatile oil was collected, probably ginger oil. This was recently injected intramuscularly to a monkey (No. 12) with no effects whatever so far.

resemble a phosphoric acid ester of one or more of the cresols. The strong alkali and heat required for its saponification and the fact that phosphate has been found in the suspected gingers would make it very probable that it may indeed be the ester suggested.

We also have the following pharmacologic evidence for the above suggestion:

1. An adulterated ginger prepared from U. S. P. fluid extract of ginger made to approximate in composition the suspected gingers behaved exactly like the suspected gingers in rabbits and monkeys. The adulterated ginger so prepared had the following composition:

	C. c.
Fluid-extract ginger, U. S. P	30
Oleo resin ginger	10
Castor oil	16
Tricresyl phosphate (technical)	24
Water	50
Alcohol	770
Total	900

The above sample of ginger was tested on 12 rabbits in daily doses of from 2 to 6 c. c. per kilo, with the result that in every case the typical symptom complex obtained with the suspected gingers followed, with ultimate death from respiratory failure. The minimum total dose of this ginger that killed rabbits was 6 c. c. per kilo, and the maximum 15 c. c. The same ginger given to a monkey (No. 11) in five doses of 10 c. c. per kilo, each given every other day, had no effects whatever.

2. A 2½ per cent solution of tricresyl phosphate (technical) in 80 per cent alcohol administered in daily doses of 5 c. c. per kilo to three rabbits produced the same typical symptom complex, ending fatally in every case. The minimum total lethal dose of this solution was 10 c. c. per kilo, and the maximum 15 c. c. per kilo.

3. Technical tricresyl phosphate administered orally to monkeys (Nos. 7 and 23) in huge doses of 10 and 15 c. c. per kilo with or without alcohol had no effects whatever.

4. The same tricresyl phosphate saponified with NaOH and heat, acidified and distilled, yielded phenols similar to those obtained from suspected gingers with similar treatment. This material administered in alcohol orally to a monkey (No. 13) in a dose equivalent to 1 c. c. per kilo of the tricresyl phosphate produced very marked typical symptoms of systemic phenolic poisoning with tremors, coma, etc. The animal died within four hours of respiratory failure.

CONCLUSIONS

If we consider the problem in the light of all the experiments performed, of which only the essential ones are detailed in this paper, the following conclusions may be drawn at this time:

1. Adulterated gingers with a reasonably certain or highly probable history of paralysis in man have yielded distillates, upon saponification and subsequent acidification, giving a positive reaction for phenols; while unsuspected adulterated gingers, as well as U. S. P. fluid-extract of ginger, treated similarly, failed to give such a reaction.

2. Suspected adulterated gingers have invariably proved toxic in rabbits in moderate doses; death, which is due to respiratory paralysis, is preceded by a symptom complex resembling very closely in its essentials, though not absolutely, systemic phenol poisoning. Unsuspected adulterated gingers in large doses, as well as U. S. P. fluid extract of ginger, failed to produce such effects.

3. All adulterated gingers examined, including the suspected ones giving a positive reaction for phenols, proved practically uniformly harmless in monkeys. A few experiments on dogs were likewise essentially negative.

4. Chemical and pharmacological evidence indicate that the phenolic substance in the suspected gingers is a stable combination of phenols, probably in the form of a phosphoric acid ester or some related substance, which resists hydrolysis and requires drastic treatment with alkali and heat to effect complete saponification. The pharmacologic experiments furthermore indicate that this stable phenolic compound breaks down with great ease in the rabbit and apparenty not at all in the monkey. The few observations we have in the dog show that it, too, is unable to liberate the phenols from this firm combination.

5. The precise relation of this phenolic compound either by itself or in combination with the other ginger constituents to the multiple neuritis in man is as yet not clear. Before we can be certain of the etiologic relationship it will be necessary to find means of reproducing the human disease in animals more faithfully than we have been able to do so far. The remarkable difference in species susceptibility we have observed tempts one to venture the suggestion that as regards susceptibility man may stand in some intermediary position between the rabbit at the one extreme and the monkey at the other. Until some satisfactory explanation of this difference in species susceptibility becomes available, the suggestion must be considered as purely speculative. We may express the hope, however, that with more chemical information on this phenolic compound and a better knowledge of its action in the animal body its etiologic relationship to the human disease may become more apparent.

Addendum.—Since the foregoing was written, an important experiment has been performed upon calves which proves almost conclusively our tentative conclusions as to the etiologic relationship of the phenolic ester to the multiple neuritis in man. A description of this experiment follows:

On June 3 three male calves of approximately the same age and weight were selected, and ginger, diluted with equal parts of water, was administered by stomach tube as follows:

Calf No. 1 (identification No. 1652), Jersey, 3 months old, weighing 60 kilos, received 5 c. c. per kilo ginger sample No. 7. This, it will be remembered, was nontoxic in rabbits and gave no phenol test chemically.

Calf No. 2 (identification No. 1651), black and white, 3 months old, weighing 80 kilos, received 5 c. c. per kilo ginger sample No. 1, which gave a positive test for phenols and proved toxic in rabbits.

Calf No. 3 (identification No. 1654), brown and white, 2 months old, weighing 86 kilos, received 5 c. c. per kilo of U. S. P. fluid extract of ginger adulterated by dilution with alcohol and the addition of 2.5 per cent technical tricresyl phosphate, castor oil, and a small amount of oleoresin ginger. (For complete formula see text.)

Moderate alcoholic intoxication followed in all cases with complete recovery within 24 hours.

On June 9 a second treatment was administered to the calves as follows:

Calf No. 1, six c. c. per kilo of ginger sample No. 7.

Calf No. 2, six c. c. per kilo of ginger sample No. 4. (This, like No. 1, gave a positive phenol test, proved toxic to rabbits, and is almost certainly known to have caused paralysis in man.)

Calf No. 3, six c. c. per kilo of U. S. P. fluid extract of ginger adulterated by dilution with alcohol and addition of 2.5 per cent tricresyl phosphate (technical) and crude resin oil instead of the oleoresin ginger and castor oil.

Calves Nos. 1 and 2 showed moderate alcoholic intoxication and recovered the following day. Calf No. 3 was markedly depressed and was unable to get up for two days. There were no tremors or other evidence of phenol poisoning. On examination on June 13 the three calves appeared normal. Nothing unusual was noted about them on June 20. The animals were not examined closely between this date and July 5. Examination on July 5 revealed distinct weakness of the hind legs in calves Nos. 2 and 3. This was noticed especially when the animals were made to run, when they would stumble frequently, with bending and dragging of the hind feet and hoofs. The anterior extremities appeared normal. The control calf No. 1 was normal. A second examination on July 7 found calves Nos. 2 and 3 in the same general condition, the weakness in

the hind legs being more pronounced. The deep reflexes of the anterior extremities appeared normal, while those of the posterior extremities were much reduced or absent.

The progress of this experiment is being followed and further experiments are being planned. Barring the remote possibility of some of the other ginger constituents or some impurity in the technical tricresyl phosphate, having something to do in a supplementary manner with the paralytic disease, it appears almost certain that the cresol-phosphoric acid-ester postulated earlier in the paper is indeed the etiologic factor of the epidemic of so-called ginger paralysis. Further pharmacologic work will be needed to elucidate the singular and highly specific action of this unique poison in man and in some of the lower animals, and its remarkably different behavior in different species of animals.

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RELATION BETWEEN TRYPANOCIDAL AND SPIROCHETICIDAL ACTIVITIES OF NEOARSPHENAMINE

By T. F. Probey, *Assistant Pharmacologist*, and G. W. McCoy, *Director, National Institute of Health (formerly the Hygienic Laboratory), United States Public Health Service*

The desirability of a test for therapeutic potency of the antisyphilitic remedies of the arsphenamine type has led to the development of the trypanocidal activity test, and later to the spirocheticidal test in experimental syphilis in rabbits. The early reports indicated that the former test was a satisfactory means of establishing the therapeutic efficiency of the arsenicals, but recent reports of the spirocheticidal test in rabbits have weakened this view.

Schamberg, Kolmer, and Raiziss (1), Dale and White (2), and Voegtlin (3) favored the adoption of the trypanocidal test as a routine control measure for the arsenicals. Numerous clinical workers, seeing the desirability of a potency or efficiency test, have supported this view. The recommendation of the Second International Conference on the Biological Standardization of Certain Remedies (4) that the therapeutic potency of arsenicals be tested by the trypanocidal test, as well as the official requirement of this test by England (5) and Germany (6), have materially strengthened this position. However, the maxim

laid down by Voegtlin and Dyer (19), Kolmer (7), and by Wakerlin (8) is that the final analysis of the evaluation of the antisyphilitic property of drugs must be ascertained on experimental syphilis in rabbits. It was therefore decided to ascertain the relation between the therapeutic activity of neoarsphenamine as measured by the trypanocidal test, using rats, and as indicated by the spirocheticidal test, using rabbits.

TRYPANOCIDAL ACTIVITY OF NEOARSPHENAMINE

Schamberg, Kolmer, and Raiziss (9) reported in 1920 that the smallest effective dose of different preparations of neoarsphenamine varied from 20 to more than 40 mg. per kilogram in the albino rat. The investigation included 22 preparations from six manufacturers. Voegtlin and Miller (10), 1922, reported an even greater variation in the products of five manufacturers, showing the most efficient to require 9.32 mg. while the least efficient required 30.08 mg. per kilogram.

Kolmer (11), in the comparison of the trypanocidal and spirocheticidal properties of arsphenamine and neoarsphenamine, showed variations of from 2 to 10 mg. per kilogram in six different neoarsphenamines. It is not reported whether the material was from the same or from different manufacturers. Dale and White (12), 1922, reporting on the trypanocidal activity of neoarsphenamine of British and German manufacturers, found the minimum effective dose of the former to be two to three times that of the latter.

SPIROCHETICIDAL PROPERTIES OF NEOARSPHENAMINE

Nichols and Walker (13), and Voegtlin, Armstrong, and Dyer (14), in 1923, reported the sterilizing dose of neoarsphenamine to be 15 mg. per kilogram for syphilis in rabbits after one treatment. The data reported, however, were on one animal only in each case. Pierce and Brown (15), 1922, previously reported that one treatment of 9 mg. per kilogram failed to sterilize. Kolmer (16), 1926, found the curative dose of six neoarsphenamines to vary between 8 and 12 mg. per kilogram. Voegtlin and Dyer (17), 1927, reporting on the sterilizing efficiency of arsphenamine, neoarsphenamine, and sulpharsphenamine in experimental syphilis, found that the minimum sterilizing dose was identical in terms of absolute amount of arsenic. They reported the sterilizing dose of neoarsphenamine after one treatment as 40 mg. per kilogram.

COMPARISON OF THE TRYPANOCIDAL AND SPIROCHETICIDAL PROPERTIES OF THE ARSENICALS

In 1922, Voegtlin (18) reported that the objection to the use of the trypanocidal test on the ground that it does not establish the rela-

tive efficiency of arsphenamine and neoarsphenamine with regard to *Treponema pallidum* is not justified, for the reason that the curative ratio of the two drugs as established by Ehrlich and Hata and Castelli in spirochete infections, including rabbit syphilis, is practically the same as that determined by Voegtlin and Smith, 1921, by means of the trypanocidal test.

Voegtlin (19), in light of work reported in 1925 on sulpharsphenamine, called attention to the fact that this drug in spite of a relatively low trypanocidal action, is as effective as arsphenamine and neoarsphenamine with regard to the healing of syphilitic lesions and freedom from clinical relapse.

Kolmer (20) accepts the trypanocidal tests as of distinct worth in evaluating the properties of arsphenamine and neoarsphenamine, although he states that the relation between the trypanocidal activity in the rat and the spirocheticidal activity in the rabbit is not definite and constant, but only broad and general.

The most interesting comparison of the trypanocidal activity in animals with spirocheticidal properties in man was reported by Dale and White (21) in 1922. This report compares the trypanocidal activity of neoarsphenamine with the dose necessary to free the chancre of *T. pallidum* in 18 to 20 hours. A parallelism was found to exist between the trypanocidal properties and the clinical effect on a primary lesion in man. It is reported that the results obtained justify the conclusion that the trypanocidal test is a very valuable index, if not an accurate quantitative measure, of the therapeutic activity of different samples of a preparation such as neoarsphenamine on syphilis in man.

TYPES OF NEOARSPHENAMINE

As pointed out by Dale and White (22) in 1922, there are two types of neoarsphenamine—one of slow solubility with relatively high toxicity, and the opposite type with rapid solubility and low toxicity. The trypanocidal activity of each group was found to parallel the toxicity of the product.

There has since been developed a new type of this product which has the qualities of the latter group and is as trypanocidally active as the former.

The classification of the two major types is represented by Groups E and F, respectively.

TRYPANOCIDAL ACTIVITY TEST

The procedure outlined by Voegtlin and Miller (23), using albino rats inoculated with *Trypanosoma equiperdum*, was followed, except that the amount of neoarsphenamine indicated by the reading which gave negative findings in 80 per cent of the rats and permitted 20

per cent to have a trace of infection was accepted as the minimum effective dose. It will be seen from Table 1, on the trypanocidal activity reported on 32 batches of neoarsphenamine from eight manufacturers, that the effective dose ranges from 10 to 15 mg. as the most efficacious, to 25 to 35 mg. as the least effective.

TABLE 1.—*Trypanocidal activity test—Neoarsphenamine*

Products	A	B	C	D	E	F	G	H
Number examined	3	2	4	2	7	6	3	5
M. E. D. (mg. per kg.)	15	15	15	15	10-15	25-35	15-20	15

The products represented by E and F, Table 1, were accepted as representing the most effective and the least effective trypanocidal activity of the neoarsphenamines.

TABLE 2.—*Trypanocidal activity of neoarsphenamines E and F*

Neoarsphenamine E							
Dose (mg. per kg.)	Lot						
	1	2	3	4	5	6	7
7	2+ 2+ + –	4+ 4+ – –	2+ 2+ 2+ +	... ...	... ...	... ...	D. D. D. ...
10	+ + + + +	– – – – –	Tr. Tr. Tr. – –	– Tr. Tr.	+ + + + +	+ + + + +	4+ 4+ – – –
15	– – – – –	– – – – –	– – – – –	... – – – ...	– – – – Tr.	– – – – Tr.	– – – – –
20	... ...	... ...	... ...	... – – – ...	– – – – –	– – – – –	... ...
M. E. D. (mg. per kg.)	15	10	15	15	15	15	15

Neoarsphenamine F						
Dose (mg. per kg.)	Lot					
	1	2	3	4	5	6
10	... ...	... ...	3+ 2+ 2+ 2+ +	2+ 2+ + + Tr.	... ...	... ...
15	D. D. D. D. D.	D. D. D. D. D.	Tr. Tr. Tr. Tr. Tr.	Tr. Tr. Tr. – –	D. 4+ + – –	D. D. D. 4+ 4+
25	D. D. 2+ – –	– – – – –	– – – – –	– – – – –	– – – – –	– – – – –
35	– – – – –	– – – – –	... ...	... ...	– – – – –	– – – – –
M. E. D. (mg. per kg.)	35	25	25	25	25	25

D=dead. Tr.=trace.

The reported variations in the trypanocidal activity of neoarsphenamine is quite apparent, as indicated in the accompanying tables. There is, however, a striking uniformity in the efficacy of the products of the same manufacturer. This would indicate that the trypanocidal activity test is valuable in ascertaining the uniformity of the therapeutic efficacy of the same product.

EXPERIMENTAL SYPHILIS IN RABBITS

The rabbits were inoculated in the left scrotum with 0.3 c. c. of testicular emulsion of Nichols's strain of *Treponema pallidum*. Only animals which developed a dark field positive typical primary lesion were used. The report of the size of the lesion as shown in the tables is the area of the chancre recorded in centimeters.

Treatment consisted of one intravenous injection of the dose of the arsenic preparation shown in the protocols. For convenience the observation is divided into pre-treatment and post-treatment periods, and recorded in days. The progress of the disease and the effect of the treatment are reported by measurements of the lesion, by examination by dark field, and by the quantitative Kahn test.

The evaluation of the therapeutic efficiency of the preparation was based upon the minimal dose which caused rapid disappearance of the spirochetes from the primary lesion and rapid healing of the lesion without clinical relapse—the so-called therapeutic dose. The choice of the products for the spirocheticidal test is based on the results obtained in the trypanocidal test. (Tables 1 and 2.) Neoarsphenamine brand E represented the most effective in trypanocidal activity, and brand F proved to be the least efficient.

TABLE 3.—*Spirocheticidal activity of neoarsphenamine, products E 1 and F 5*

THERAPEUTIC EFFECT AT 15 MG. PER KG.

Product	Rabbit No.	Pre-treatment [1]			Post-treatment																													
		56 days			7 days			17 days			24 days			32 days			38 days			46 days			52 days			59 days			67 days		
		Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn
E 1	62	0.69	+	120	0.63	–	40	–	–	20	–	–	20	–	–	4	–	–	4	–	–	4	–	–	20	–	–	80	–	–	80
	78	1.38	+	80	.44	–	4	–	–	4	–	–	4	–	–	20	–	–	20	–	–	4	–	–	40	–	–	40	–	–	20
	79	.72	+	120	.34	–	40	–	–	40	–	–	20	–	–	4	–	–	4	–	–	4	(2)	(2)	(2)						
	80	1.40	+	120	.32	–	40	–	–	80	–	–	80	–	–	20	–	–	40	–	–	4	–	–	20	–	–	4	–	–	20
	82	2.41	+	40	.57	–	40	–	–	80	–	–	80	(3)	(3)	(3)															
	84	.97	+	4	.26	–	4	0.21	–	80	–	–	4	–	–	4	–	–	4	–	–	4	–	–	4	–	–	4	–	–	4
F 5	71	.94	+	120	.28	–	4	–	–	20	–	–	20	–	–	20	–	–	20	–	–	4	–	–	4	–	–	20	–	–	20
	72	(4)	+	40	.25	–	4	–	–	20	–	–	20	–	+	20	0.63	+	20	1.16	+	80	1.57	+	80	2.32	+	40	3.14	+	40
	73	.85	+	40	.26	–	4	–	–	20	–	–	20	–	–	20	–	–	20	–	–	20	–	–	4	–	–	20	–	–	4
	75	1.38	+	200	.34	–	40	.38	–	20	–	–	4	–	–	4	–	–	4	(5)	(5)	(5)									
	76	1.63	+	240	.29	–	20		–	20	–	–	20	–	–	20	–	–	20	–	–	20	–	–		(6)	(6)	(6)			

THERAPEUTIC EFFECT AT 10 MG. PER KG.

Product	Rabbit No.	Pre-treatment [1]			Post-treatment																													
		56 days			7 days			17 days			24 days			32 days			38 days			46 days			52 days			59 days			67 days		
		Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn
E 1	44	1.70	+	240	0.82	–	80	–	–	160	–	–	120	–	–	200	–	+	160	–	–	80	0.75	+	120	1.38	+	160	1.82	+	200
	47	2.17	+	200	2.07	–	240	0.21	–	40	–	–	40	–	–	80	–	–	20	–	–	20	–	–	20	–	–	20	–	–	20
	49	.88	+		.69	–	200	.09	–	80	–	+	20	0.47	+	40	0.97	+	40	1.89	+	40	2.01	+	40	2.70	+	20	3.08	+	20
	51	2.01	+	120	.82	–	120	–	–	200	–	–	320	–	–	80	1.45	+	80	1.66	+	120	3.08	+	120	2.76	+	200	4.76	+	200
	65	.50	+		.24	–	20	–	–	40	–	–	20	–	–	20	–	–	20	–	–	20	–	–	20	–	–	20	–	–	40
	87	.88	+	160	.24	–	40	–	–	40	–	–	4	–	–	4	–	–	4	–	–	4	–	–	4	–	–	4	–	–	4
F 5	41	1.42	+	160	.44	–	80	.15	–	120	–	–	80	–	–	20	–	–	20	–	–	20	–	–	4	–	–	4	–	–	4
	43	1.29	+	160	.60	–	120	.23	+	160	0.31	+	200	.38	+	120	.82	+	120	1.16	+	120	.72	+	120	.98	+	160	.88	+	120
	77	(4)	+	40	.18	–	4	–	–	20	–	+	40	.66	+	40	1.10	+	40	1.26	+	80	1.38	+	80	1.72	+	120	2.26	–	120
	85	1.95	+	120	.72	–	80	.23	–	80	–	+	40	–	–	40	–	–	40	–	–	40	–	–	40	–	–	40	–	–	40
	86	1.63	+	160	1.32	–	20	.18	–	40	–	–	20	–	–	20	–	–	20	–	–	4	–	–	4	–	–	4	(7)	(7)	(7)
	89	1.04	+	80	1.26	–	40	1.17	–	20	–	–	4	–	–	4	–	–	4	–	–	4	–	–	4	(8)	(8)	(8)			

[1] Total period of pre-treatment, 59 days. Treated Sept. 14, 1928.
[2] Dead Nov. 2, 1928.
[3] Dead Oct. 14, 1928.
[4] Orchitis.
[5] Dead Oct. 27, 1928.
[6] Dead Nov. 6, 1928.
[7] Dead Nov. 19, 1928.
[8] Dead Nov. 11, 1928.

Table 3.—*Spirocheticidal activity of neoarsphenamine, products E 1 and F 5*—Continued

THERAPEUTIC EFFECT AT 5 MG. PER KG.

Product	Rabbit No.	Pre-treatment			Post-treatment																										
		56 days			7 days			17 days			24 days			32 days			38 days			46 days			52 days			59 days			67 days		
		Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn	Lesion	Dark field	Kahn
E 1	54	0.64	+	200	1.51	+	120	2.16	+	120	3.58	+	120	3.93	+	200	3.91	+	240	3.21	+	240	2.89	+	200	2.26	+	160	2.89	+	240
	60	1.26	+	200	.44	—	200	.69	+	120	1.51	+	120	2.08	+	280	1.76	+	240	2.67	+	200	2.42	+	160	2.67	+	160	2.07	+	160
	61	1.10	+	200	.20	+	200	.40	+	40	1.19	+	20	2.52	+	320	2.41	+	160	2.53	+	200	2.26	+	160	1.85	+	120	.75	+	120
	63	1.36	+	160	.60	—	40	.25	—	40	1.41	+	80	1.07	—	280	.91	+	120	1.73	—	160	1.82	—	120	1.82	—	120	1.67	—	120
	64	.56	+	20	.21	—	120	—	—	4	—	—	20	—	—	4	—	—	4	—	—	4	—	—	4	—	—	4	—	+	20
	90	(4)	+	20	.90	+	20	1.54	+	40	2.61	+	40	3.39	+	80	3.53	+	80	2.61	—	160	1.38	+	120	1.15	—	120	—	—	80
F 5	48	.38	+	280	.60	—	160	1.13	+	160	1.85	+	200	2.10	+	200	2.26	+	200	3.08	+	200	3.57	+	200	4.30	+	200	4.75	+	200
	52	1.62	+	120	1.64	—	120	1.51	+	240	3.72	+	320	3.51	+	240	(9)	(9)	(9)												
	57	1.85	+	120	1.16	+	120	2.41	+	80	2.83	+	120	3.39	+	160	2.82	+	200	1.26	+	160	.63	+	160	.38	+	160	.41	+	200
	58	1.57	+	200	.85	+	80	1.29	+	40	2.38	+	40	2.55	+	240	2.01	+	160	1.41	+	240	.78	+	200	—	—	80	—	—	40
	59	.72	+	160	.21	—	160	.13	—	20	—	—	40	—	+	20	—	+	20	—	—	40	—	—	20	—	—	20	—	—	20
	88	(4)	+	40	(4)	+	20	(4)	+	20	(4)	+	20	(4)	+	40	(4)	+	40	(4)	+	80	(4)	+	80	(4)	+	120	(4)	+	120
UNTREATED CONTROLS																															
	42	0.23	+	120	0.72	+	120	1.26	+	200	2.07	+	160	2.93	+	120	3.02	+	120	3.46	+	160	3.27	+	120	2.95	+	120	1.64	+	120
	46	.36	+	160	1.67	+	280	2.61	+	240	2.67	+	200	5.41	+	240	5.97	+	200	6.69	+	240	6.61	+	200	4.68	+	160	2.39	+	160
	56	.94	+	200	1.16	+	200	2.28	+	160	2.48	+	240	2.61	+	200	3.02	+	240	3.39	+	200	3.87	+	200	4.93	+	160	2.91	+	160
	45	1.01	+	280	1.16	+	400	1.03	+	200	.98	+	200	1.03	+	200	1.07	+	160	.30	+	200	.28	+	160	(4)	+	160	(4)	+	160
	66	.94	+		3.02	+	400	3.61	+	280	5.15	+	240	2.83	—	200	.91	—	160	.38	—	200	—	—	160	—	+	120	—	—	160
	68	4.15	+	160	6.69	+	280	7.45	+	240	8.23	+	200	7.26	+	240	6.25	—	120	—	—	160	—	—	120	—	—	160	—	—	160
	70	1.04	+		3.80	+	280	4.75	+	280	4.30	+	200	(3)	(3)	(3)															
	83	.38	+	20	1.29	+	200	1.85	+	160	1.92	+	160	2.17	+	200	1.29	—	160	.53	+	200	.19	—	160	—	—	120	—	—	200

[3] Dead Oct. 14, 1928.

[4] Orchitis.

[9] Dead Oct. 21, 1928.

The therapeutic effect of neoarsphenamine E 1 and F 5 at 15, 10, and 5 mg. per kilogram on experimental rabbit syphilis is reported in Table 3. The animals were given one treatment 59 days after inoculation. In this series the therapeutic dose was established at 15 mg. for both products. At this dose all animals on E 1 became dark-field negative; the chancres healed and remained negative throughout the observation period. The findings on F 5 were comparable, except that one rabbit, No. 72, had relapsed 32 days after treatment.

The results obtained with the 10 mg. dose indicate that both products are ineffective. This conclusion is inevitable from the fact that while all rabbits on lot E 1 became dark-field negative and the chancres healed, there were three relapses; and, further, that, although four animals on F 5 remained negative throughout the observation period, two showed relapses.

As would be expected, the effect of 5 mg. was very feeble. Except for one animal on each product, which was negative, the results very closely paralleled the control group.

Of the control (no treatment) group of eight rabbits, one died rather early, three became negative approximately 97 days after inoculation, about 38 days after administration of the drug in the treated group, and four were positive on discharge 126 days after inoculation.

TABLE 4.—*Spirocheticidal activity of neoarsphenamine, products E 7 and F 6*

15 MG. PER KG.

Product	Rabbit No.	Pre-treatment[1] 65 days: Lesion	Pre-treatment[1] 65 days: Dark field	Pre-treatment[1] 65 days: Kahn	7 days: Lesion	7 days: Dark field	11 days: Lesion	11 days: Dark field	18 days: Lesion	18 days: Dark field	18 days: Kahn	25 days: Lesion	25 days: Dark field	29 days: Lesion	29 days: Dark field	29 days: Kahn	40 days: Lesion	40 days: Dark field	47 days: Lesion	47 days: Dark field	47 days: Kahn	53 days: Lesion	53 days: Dark field	63 days: Lesion	63 days: Dark field	63 days: Kahn	88 days: Lesion	88 days: Dark field	88 days: Kahn
E7	155	([2])	+	20	([3])	—	([3])	—	—	—	20	—	—	—	----	4	—	----	—	----	4	—	----	—	----	4	----	----	----
	164	3.58	+	80	—	—																							
	165	7.26	+	80	5.57	—	([3])	—																					
	167	5.72	+	20	2.33	—	1.38	—	0.38	—	4	—	—	—	----	4	—	----	—	----	4	—	----	—	----	----	----	----	----
	170	2.23	+	40	1.26	—	1.16	—	.60	—	20	0.66	—	0.31	—	4	—	----	—	----	4	—	----	—	----	4	—	----	4
	163	3.27	+	160	2.48	—	.25	—	—	—	40	—	—	—	----	20	—	----	—	----	20	—	----	—	----	4	—	----	4
F 6	147	2.95	+	20	1.16	—	.72	—	—	—	4	—	—	—	—	4	—	----	—	----	4	—	----	—	----	4	—	----	40
	141	3.33	+	20	2.04	—	2.11	—	.91	—	4	.28	—	.25	+	4	—	—	—	----	0	—	----	—	----	0	—	----	0
	145	5.81	+	120	5.15	—	5.21	—	3.80	—	40	.38	—	.31	—	20	—	—	—	----	20	—	----	—	----	20	—	----	20
	146	6.35	+	80	5.91	—	5.22	—	—	—	20	—	—	—	----	4	—	----	—	----	4	—	----	—	----	4	—	----	4
	148	8.36	+	120	7.73	—	.88	—	—	—	20																		
	181	.75	+	4	.50	—	—	—	—	—	4	—	—	—	----	4	—	----	—	----	0	—	----	—	----	0	—	----	0

12.5 MG. PER KG.

Product	Rabbit No.	Pre-treatment[1] 65 days: Lesion	Pre-treatment[1] 65 days: Dark field	Pre-treatment[1] 65 days: Kahn	7 days: Lesion	7 days: Dark field	11 days: Lesion	11 days: Dark field	18 days: Lesion	18 days: Dark field	18 days: Kahn	25 days: Lesion	25 days: Dark field	29 days: Lesion	29 days: Dark field	29 days: Kahn	40 days: Lesion	40 days: Dark field	47 days: Lesion	47 days: Dark field	47 days: Kahn	53 days: Lesion	53 days: Dark field	63 days: Lesion	63 days: Dark field	63 days: Kahn	88 days: Lesion	88 days: Dark field	88 days: Kahn
E 7	150	2.55	+	40	0.91	—	0.41	—	—	—	20	—	—	—	----	20	—	----	—	----	20	—	----	—	----	20	—	----	20
	174	5.19	+	40	1.54	—	.57	—	—	—	40	—	—	—	----	20	—	----	—	----	4	—	----	—	----	4	—	----	4
	175	2.17	+	80	.91	—	.22	—	—	—	20	—	—	—	----	20	—	----	—	----	40	—	----	—	----	4	—	----	4
	176	4.02	+	80	2.35	—	1.42	—	0.38	—	20	—	—	—	----	20	—	----	—	----	80	—	----	—	----	20	—	----	4
	178	6.79	+	120	2.42	—	1.63	—	.56	—	80	—	—	—	----	120	—	----	—	----	80	—	----	—	----	20	—	----	20
	179	7.95	+	20	5.22	—	1.57	—	([2])	—	4	—	—	—	----	4	—	----	—	----	4	—	----	—	----	4	—	----	4
F 6	171	([2])	+	20	—	—	----	—	—	—	4																		
	149	3.33	+	120	1.38	—	.31	—	—	—	20	—	—	—	----	20	—	----	—	----	20	—	----	—	----	4	—	----	4
	151	4.46	+	80	5.41	—	5.15	—	.72	—	40	—	—	—	----	20	—	----	—	----	20	—	----	—	----	4	—	----	4
	156	8.23	+	40	7.26	—	7.49	—	1.57	—	20	0.31	—	—	----	4	—	----	—	----	4	—	----	—	----	4	—	----	4
	160	1.83	+	20	.38	—	.16	—	—	—	4	—	—	—	----	4	—	----	—	----	4	—	----	—	----	160	—	----	4
	162	3.74	+	40	.41	—	—	—	—	—	4	—	—	—	----	4	—	----	—	----	4	—	----	—	----	20	—	----	40

UNTREATED CONTROLS

	144	7.54	+	160	8.14	+	7.86	+	7.17	+	120	7.20	+	6.25	−	120	0.6	−	−	−	80	−	−	−	−	20	−	----	4
	183	5.21	+	120	3.39	+	1.07	−	------	−	80	------	−	------	−	80	−	−	------	−	40	−	−	−	−	20	−	----	4
	185	6.60	+	200	3.14	+	3.27	+	2.39	−	240	L, 72 R, 3.80	+	L, 82 R, 3.80	−	200	L, − R, 0.66	−	L, − R, −	−	120	−	−	−	−	40	−	----	20
	187	.47	+	40	−	−	([2])	+	([2])	+	4	1.57	+	2.17	+	40	5.39	+	4.46	+	40	4.90	−	3.58	−	40	----	----	----
	188	3.21	+	4	2.70	+	1.45	+	1.38	−	20	------	------	------	------	------	------	------	------	------	------	------	------	------	------	----	----	----	----
	182	8.05	+	120	7.64	+	8.87	+	5.81	−	120	2.67	−	2.23	+	120	1.57	+	1.57	−	120	1.73	−	------	----	----	----	----	----
	172	.19	+	20	.94	+	1.26	+	2.26	+	80	2.48	+	3.58	+	80	L, 6.06 R, 1.57	+	L, 6.07 R, 1.76	+	160	L, 5.41 R, 1.63	+	L, 5.00 R, −	+	80	−	−	4

[1] Treated on sixty-ninth day.
[2] Orchitis.
[3] Scab.
L = left scrotum.
R = right scrotum.

The products reported in Table 4 represent two other lot numbers of the same manufacturer's neoarsphenamine as that reported in the previous table. These lots, E 7 and F 6, were tested at 15 and 12.5 mg. per kg., with one treatment 69 days after inoculation. There is no apparent difference in the effect on the lesions, as all animals became dark-field negative, the chancres healed, and there was no clinical relapse. The therapeutic dose is indicated to be 12.5 mg. or less per kg., but it is impossible to state definitely, as lower dosage was not included in this series.

The strength of the Kahn reactions definitely paralled the early syphilitic involvement. This is very noticeable in the successfully treated group, where there is a very rapid disappearance of the chancre, accompanied by a reversal of the Kahn reaction. This parallelism of the Kahn reaction with the primary syphilitic lesion, and the reversal of the Kahn test accompanied by healing of the chancre in the treated animals, indicates no apparent difference in the serological results of the two neoarsphenamines tested. These results agree with the reported findings of Wakelin et al. (24) that there is a definite parallelism between the Kahn reaction with the intensity of the experimental syphilitic involvement.

The disappearance of the organism from the chancre does not indicate the efficacy of the drug. This will be seen in the 10-mg. dose, Table 3, which gave negative dark-field results in all animals, but clinical relapse occurred in 5 of the 12 rabbits. Even at 5 mg. 3 rabbits treated with each product were dark-field negative on the first posttreatment observation, but 2 of each group relapsed.

TABLE 5.—*Duration of chancre and presence of Treponema after certain periods of treatment (average, in days)*

Product	Number of rabbits	Dose (mg. per kg.)	Duration of (in days)—	
			Chancre	Treponema
F 5	5	15	18.4	7
F 6	6	15	25.8	7
F 6	6	12.5	16.8	7
E 1	6	15	18	7
E 7	4	15	25.2	7
E 7	6	12.5	21.5	7
Controls	7		>74	>56
	6		51	43

It is evident (Table 5) that there is no noteworthy difference in the power of these products to cause rapid disappearance of spirochetes from the chancre and rapid healing of the lesion without clinical relapse, though, as stated above, there is a very pronounced difference in trypanocidal activity. The chancre disappeared after an average of 19.8 days after treatment with product F and after 21.2 days

when product E was used. These figures agree with those obtained by Wakelin, Lorenz, and Lovenhart (25) in 1925, on a series of nine rabbits receiving three doses of neoarsphenamine of 1 to 4 ratio to the tolerated dose (50 to 75 mg. per kg.). They reported the average duration of the chancre from the institution of treatment as 24 days.

TABLE 6.—*The trypanocidal and spirocheticidal properties of neoarsphenamine—per cent of efficacy*

Product	Trypanocidal test				Spirocheticidal test				
	Dose (mg. per kg.)			M. E. D. (mg. per kg.)	Dose (mg. per kg.)				Effective dose (mg. per kg.)
	35	25	15		15	12.5	10	5	
	Per cent	*Per cent*	*Per cent*		*Per cent*	*Per cent*	*Per cent*	*Per cent*	
F 5	100	100	40	25	80	--------	66	17	15
F 6	100	100	000	25	100	100	--------	--------	>12.5
	15	10	7						
E 1	100	0	25	15	100	--------	50	17	15
E 7	100	60	0	15	100	100	--------	--------	>12.5

Table 6 was prepared for convenience in order that the trypanocidal and spirocheticidal activity might be readily compared. The results are evident and need no further comment.

CONCLUSION

From the limited data presented here two brands of neoarsphenamine varying markedly in their trypanocidal activity have shown approximately the same ability (1) to cause the rapid disappearance of spirochetes from the chancre, (2) to cause the rapid healing of the lesion with freedom from clinical relapse, and (3) to influence the Kahn reaction in experimental rabbit syphilis over periods of 67 to 88 days.

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COURT DECISION RELATING TO PUBLIC HEALTH

Compensation under workmen's compensation act awarded for injury through infection following vaccination.—(Texas Court of Civil Appeals; Texas Employers' Insurance Association *v.* Mitchell, 27 S. W. (2d) 600; decided Apr. 15, 1930.) In March, 1928, a number of cases of smallpox developed in the city of Sherman. The employees of a company in that city were directed by the company's manager to be vaccinated or to bring a physician's certificate stating that vaccination was unnecessary. This direction was coupled with the ultimatum that, unless they did so, they could not work for the company until after the smallpox epidemic was over. No member of the State or city board of health, acting as a public agency for the public interest, in any wise directed or caused the vaccination of the employees. One of the employees who was vaccinated suffered injury because of infection following the vaccination. Her vaccination was done by a physician who was suggested to her and the cost of the vaccination was taken out of her pay check. The physician received payment from the company.

Compensation under the workmen's compensation act was granted to the injured employee and the awarding of compensation for such injury was upheld by the court of civil appeals. The following are excerpts from the appellate court's opinion:

The order for vaccination was given on Thursday, March 22, and the vaccination was to be done "Friday," or before Monday morning, March 26. The circumstances do not reflect the purpose of the manager in so peremptorily ordering the vaccination of the employees to have been to discharge a purely moral obligation to provide for medical attention or to further the personal welfare of the employees. Neither do they reflect his intention to require the vaccination to have been an act entirely outside the range of the employees' service to their employer. The circumstances strongly point to the view that in the emergency of the smallpox epidemic the vaccination was for the purpose of furthering the work or business of the factory by having the employees made immune to smallpox as a precaution against suspension or interruption through smallpox of the regular work or business of the factory. * * * Compliance with the special order was intended to operate as an obligation of employment on the part of the employees, and noncompliance was intended to operate as an act inconsistent with the relation of master and servant and incompatible with the faithful performance of duty owing the employer. * * *

* * * In the present case the employer himself, through the manager, in furtherance of his business, and not as a State or public agency, ordered the employees to be vaccinated; and the vaccination wound received in the act of vaccination came in direct contact with infectious or poisonous matter, resulting in the injury complained of.

DEATHS DURING WEEK ENDED JULY 12, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended July 12, 1930, and corresponding week of 1929. (From the Weekly Health Index, July 16, 1930, issued by the Bureau of the Census, Department of Commerce)

	Week ended July 12, 1930	Corresponding week, 1929
Policies in force	76, 067, 749	74, 515, 561
Number of death claims	13, 433	12, 174
Death claims per 1,000 policies in force, annual rate	9. 2	8. 5

Deaths from all causes in certain large cities of the United States during the week ended July 12, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, July 16, 1930, issued by the Bureau of the Census, Department of Commerce)

City	Week ended July 12, 1930		Annual death rate per 1,000, corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended July 12, 1930 [2]
	Total deaths	Death rate [1]		Week ended July 12, 1930	Corresponding week, 1929	
Total (65 cities)	6, 507	11. 4	11. 2	616	615	[3] 55
Akron	19			3	4	27
Albany [4]	41	17. 8	13. 9	0	0	0
Atlanta	88	18. 0	14. 5	11	10	116
White	45			4	4	127
Colored	43	([5])	([5])	7	6	111
Baltimore [4]	189	11. 9	13. 1	19	20	65
White	143			14	9	60
Colored	46	([5])	([5])	5	11	81
Birmingham	59	13. 8	16. 2	5	9	47
White	28			2	6	31
Colored	31	([5])	([5])	3	3	71
Boston	170	11. 1	11. 0	19	16	54
Bridgeport	29			2	5	34
Buffalo	128	12. 0	10. 6	15	10	67
Cambridge	18	7. 5	7. 9	2	3	37
Camden	22	8. 5	10. 4	2	2	36
Canton	22	9. 8	7. 6	0	3	0
Chicago [4]	578	9. 5	10. 9	57	63	50
Cincinnati	122			10	9	59
Cleveland	175	9. 0	8. 0	19	11	57
Columbus	68	11. 9	12. 6	5	3	49
Dallas	56	13. 4	12. 2	7	5	
White	41			7	4	
Colored	15	([5])	([5])	0	1	
Dayton	39	11. 0	8. 5	1	1	15
Denver	102	18. 1	10. 5	16	6	167
Des Moines	31	10. 6	11. 0	2	3	35
Detroit	256	9. 7	9. 5	36	29	56
Duluth	33	14. 7	8. 5	1	0	27
El Paso	30	13. 3	15. 9	6	11	
Erie	45			6	1	128
Fall River [4]	22	8. 5	6. 6	2	6	46
Flint	22	7. 7	9. 5	0	6	0
Fort Worth	38	11. 6	11. 0	6	4	
White	30			5	4	
Colored	8	([5])	([5])	1	0	
Grand Rapids	32	10. 2	8. 6	5	9	76
Houston	62			7	6	
White	35			5	3	
Colored	27	([5])	([5])	2	3	
Indianapolis	99	13. 5	13. 5	1	8	7
White	86			1	6	9
Colored	13	([5])	([5])	0	2	0
Jersey City	58	9. 3	11. 9	5	6	43
Kansas City, Kans	31	13. 7	16. 3	5	4	118
White	24			4	3	106
Colored	7	([5])	([5])	1	1	217
Kansas City, Mo	97	12. 9	13. 9	9	11	70

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended July 12, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, July 16, 1930, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended July 12, 1930		Annual death rate per 1,000, corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended July 12, 1930 [2]
	Total deaths	Death rate [1]		Week ended July 12, 1930	Corresponding week, 1929	
Knoxville	30	14.8	18.8	3	10	70
White	24			3	7	78
Colored	6	(5)	(5)	0	3	0
Los Angeles	249			28	17	85
Louisville	74	11.7	13.9	3	3	26
White	57			3	3	30
Colored	17	(5)	(5)	0	0	0
Lowell	26			2	4	47
Lynn	11	5 4	9.9	0	3	0
Memphis	78	21.4	15.4	7	5	83
White	41			5	1	92
Colored	37	(5)	(5)	2	4	67
Milwaukee	101	9.7	8.1	10	13	50
Minneapolis	107	12.2	9.3	9	8	58
Nashville	73	27.3	22.8	3	10	46
White	41			2	9	41
Colored	32	(5)	(5)	1	1	63
New Bedford	21			5	2	128
New Haven	30	8 3	9.7	1	0	19
New Orleans	155	18.8	14.2	15	13	87
White	97			11	7	97
Colored	58	(5)	(5)	4	6	67
New York	1,248	10 8	11.0	125	93	53
Bronx Borough	178	9.8	7.3	8	15	19
Brooklyn Borough	412	9.3	9.7	51	35	54
Manhattan Borough	462	13.7	15.8	54	36	89
Queens Borough	149	9.1	7.8	7	3	20
Richmond Borough	47	16.3	16.3	5	4	93
Newark, N. J	101	11.1	10.7	9	12	47
Oakland	46	8.8	9.7	5	1	60
Oklahoma City	53			17	5	334
Omaha	65	15.2	14.0	5	4	57
Paterson	37	13.3	11.5	6	7	104
Philadelphia	391	9.9	11.7	31	46	46
Pittsburgh	152	11.8	10.8	16	15	59
Portland, Oreg	79			2	3	25
Providence	56	10.2	12.0	6	5	55
Richmond	45	12.1	16.4	2	4	30
White	29			0	1	0
Colored	16	(5)	(5)	2	3	87
Rochester	61	9.7	11.0	3	9	27
St. Louis	236	14.5	12.7	19	14	62
St. Paul	59			1	2	10
Salt Lake City [4]	31	11.7	12.8	4	4	63
San Antonio	67	16.0	12.4	16	15	
San Diego	49			1	2	21
San Francisco	179	15.9	8.9	6	7	41
Schenectady	18	10.1	13.4	1	4	31
Seattle	77	10.5	7.8	1	3	10
Somerville	21	10.7	7.1	1	2	33
Spokane	26	12.4	7.2	1	2	26
Springfield, Mass	34	11.8	11.8	6	1	95
Syracuse	27	7.1	9.9	4	2	50
Tacoma	24	11.3	8.0	3	0	77
Toledo	88	14.7	13.0	5	9	46
Trenton	30	11.3	18.4	4	4	74
Utica	25	12.5	15.0	2	3	57
Washington, D. C	142	13.4	12.2	17	16	99
White	92			7	8	60
Colored	50	(5)	(5)	10	8	177
Waterbury	19			2	1	51
Wilmington, Del	20	8.1	13.0	0	0	0
Worcester	45	11.9	12.7	1	5	13
Yonkers	14	6.0	6.0	1	1	24
Youngstown	38	11.4	8.7	9	3	141

[1] Annual rate per 1,000 population.
[2] Deaths under 1 year per 1,000 births. Cities left blank are not in the registration area for births.
[3] Data for 73 cities.
[4] Deaths for week ended Friday.
[5] In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended July 12, 1930, and July 13, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 12, 1930, and July 13, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 12, 1930	Week ended July 13, 1929	Week ended July 12, 1930	Week ended July 13, 1929	Week ended July 12, 1930	Week ended July 13, 1929	Week ended July 12, 1930	Week ended July 13, 1929
New England States:								
Maine	10	6	--------	1	42	34	1	1
New Hampshire	--------	1	--------	--------	10	12	0	0
Vermont	2	1	--------	--------	10	--------	0	0
Massachusetts	37	60	1	3	440	263	2	1
Rhode Island	2	3	--------	--------	11	44	1	0
Connecticut	1	17	1	1	20	36	1	1
Middle Atlantic States:								
New York	98	181	[1] 1	[1] 5	1,075	403	11	26
New Jersey	91	75	2	--------	535	75	2	3
Pennsylvania	71	83	--------	--------	638	427	1	8
East North Central States:								
Ohio	42	45	6	10	194	439	5	12
Indiana	10	11	--------	--------	53	43	4	1
Illinois	113	148	3	2	138	560	8	7
Michigan	54	74	1	--------	266	309	6	17
Wisconsin	12	13	2	6	54	482	0	3
West North Central States:								
Minnesota	10	11	--------	1	99	79	1	2
Iowa	4	3	--------	--------	53	21	1	3
Missouri	22	34	--------	1	43	21	3	4
North Dakota	--------	5	--------	--------	4	25	1	0
South Dakota	13	7	--------	--------	50	4	1	0
Nebraska	10	3	--------	--------	10	57	0	0
Kansas	7	3	--------	--------	63	114	0	0
South Atlantic States:								
Delaware	--------	2	--------	--------	7	2	0	0
Maryland [2]	12	9	3	5	18	12	0	0
District of Columbia	5	4	--------	1	22	7	0	0
West Virginia	4	8	9	--------	20	64	0	0
North Carolina	18	26	5	--------	30	--------	0	0
South Carolina	2	15	52	104	--------	2	2	0
Georgia	4	6	6	5	10	--------	1	3
Florida	4	3	2	1	16	4	0	3
East South Central States:								
Kentucky	--------	--------	--------	--------	--------	--------	1	0
Tennessee	3	4	8	6	24	15	3	2
Alabama	6	7	1	4	36	10	0	0
Mississippi	4	12	--------	--------	--------	--------	2	0

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 12, 1930, and July 13, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 12, 1930	Week ended July 13, 1929	Week ended July 12, 1930	Week ended July 13, 1929	Week ended July 12, 1930	Week ended July 13, 1929	Week ended July 12, 1930	Week ended July 13, 1929
West South Central States:								
Arkansas	1	1	7		4	6	0	0
Louisiana	19	12	3	5	1	8	1	3
Oklahoma [3]	6	10	4	18	16	14	1	2
Texas	10	17	1	8	14	34	1	0
Mountain States:								
Montana	1	2			2		1	2
Idaho	1			2	4	7	2	1
Wyoming			1		10	6	0	0
Colorado	6	10			68	7	0	0
New Mexico	3				13	7	0	1
Arizona		1			61	5	1	0
Utah [2]			1	2	19	4	4	10
Pacific States:								
Washington	6	7	3		192	56	1	2
Oregon	5	2	3	6	32	28	0	
California	53	48	19	6	552	76	4	5

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 12, 1930	Week ended July 13, 1929	Week ended July 12, 1930	Week ended July 13, 1929	Week ended July 12, 1930	Week ended July 13, 1929	Week ended July 12, 1930	Week ended July 13, 1929
New England States:								
Maine	0	0	19	11	0	0	0	6
New Hampshire	0	0	1	6	0	0	0	0
Vermont	0	0	0	0	0	1	0	0
Massachusetts	6	0	73	78	0	0	8	1
Rhode Island	0	0	6	3	0	0	1	0
Connecticut	0	0	7	19	0	0	1	2
Middle Atlantic States:								
New York	10	12	121	126	13	1	22	26
New Jersey	0	1	54	38	0	0	8	10
Pennsylvania	1	1	126	112	0	0	12	15
East North Central States:								
Ohio	1	1	121	146	51	43	21	23
Indiana	5	0	42	46	76	31	11	3
Illinois	3	1	146	111	34	27	26	16
Michigan	1	0	99	170	40	42	4	1
Wisconsin	0	0	40	52	10	8	0	2
West North Central States:								
Minnesota	6	0	38	37	1	4	2	3
Iowa	2	0	14	26	48	21	0	4
Missouri	0	0	32	14	12	6	13	11
North Dakota	0	0	3	3	10	3	4	1
South Dakota	1	0	4	2	41	13	0	0
Nebraska	0	0	5	10	10	20	0	1
Kansas	9	1	19	31	21	18	7	10
South Atlantic States:								
Delaware	0	0	9	1	0	0	1	1
Maryland [2]	0	0	18	10	0	0	8	26
District of Columbia	0	0	6	7	0	0	1	0
West Virginia	0	0	9	11	17	16	11	12
North Carolina	6	6	21	20	13	17	58	45
South Carolina	1	4	1	7	0	1	59	87
Georgia	1	1	4	12	0	0	59	54
Florida	0	0	4	1	0	0	2	3
East South Central States:								
Kentucky	0	0	18	24	0	5	22	7
Tennessee	1	4	7	3	10	1	56	43
Alabama	3	1	2	15	0	1	24	24
Mississippi	1	0	4	2	1	1	58	40

[2] Week ended Friday.

[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 12, 1930, and July 13, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 12, 1930	Week ended July 13, 1929	Week ended July 12, 1930	Week ended July 13, 1929	Week ended July 12, 1930	Week ended July 13, 1929	Week ended July 12, 1930	Week ended July 13, 1929
West South Central States:								
Arkansas	1	0	4	1	12	0	39	2
Louisiana	29	0	12	9	1	1	34	29
Oklahoma [1]	14	0	8	10	34	13	16	33
Texas	1	1	5	22	24	24	16	9
Mountain States:								
Montana	4	0	23	6	5	2	1	1
Idaho	0	0	0	2	3	11	0	1
Wyoming	0	0	2	2	1	5	0	1
Colorado	0	0	8	7	5	17	3	8
New Mexico	3	1	5	9	2	0	9	5
Arizona	2	1	2	2	0	0	10	0
Utah [2]	0	0	2	3	0	4	0	4
Pacific States:								
Washington	2	0	25	10	43	12	2	10
Oregon	0	1	7	4	9	27	7	4
California	99	6	50	98	33	14	19	13

[1] Week ended Friday. [2] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those State from which reports are received during the current week:

State	Cerebrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April, 1930										
Massachusetts	18	284	45	2	5,751		3	1,206	0	20
May, 1930										
Delaware		8			50		0	38	0	0
June, 1930										
Iowa	5	18			360		0	111	427	10
Massachusetts	16	203	8	7	4,227	2	3	603	0	17
Nebraska	2	20		1	279		0	90	140	7
New Jersey	16	341	14	1	4,268		1	467	0	23
New Mexico	6	37	2	17	156		1	20	21	6
North Dakota	2	15	1		56		4	53	87	3
Porto Rico		20	115	594	55	4	1		0	42
South Carolina		67	549	1,686	149	1,661	7	14	7	239
Tennessee	21	23	45	243	349	66	5	100	49	119
Vermont		1			196		0	25	0	0

April, 1930

Massachusetts:	Cases
Anthrax	4
Chicken pox	857
Dysentery	1
Lethargic encephalitis	2
German measels	1,106
Mumps	809
Ophthalmia neonatorum	104
Septic sore throat	40
Tetanus	1
Trachoma	3
Whooping cough	1,315

May, 1930

Delaware:	
Anthrax	1
Chicken pox	19
Mumps	2
Whooping cough	21

June, 1930

	Cases
Anthrax:	
Massachusetts	1
New Jersey	1
Porto Rico	1
Chicken pox:	
Iowa	74
Massachusetts	876
Nebraska	113
New Jersey	613
New Mexico	33
North Dakota	15
South Carolina	209
Tennessee	83
Vermont	96
Dengue:	
Porto Rico	1
South Carolina	5
Diarrhea:	
Porto Rico	1
South Carolina	2,949
Dysentery:	
Massachusetts	1
New Jersey	1
Porto Rico	7
Tennessee	63
Filariasis:	
Porto Rico	1
German measles:	
Massachusetts	820
New Jersey	453
New Mexico	3
South Carolina	11
Hookworm disease:	
South Carolina	118
Impetigo contagiosa:	
Tennessee	1
Lead poisoning:	
Massachusetts	4
New Jersey	4
Leprosy:	
Porto Rico	1
Lethargic encephalitis:	
Massachusetts	3
New Mexico	1
North Dakota	2
South Carolina	2
Tennessee	1
Mumps:	
Iowa	44
Massachusetts	454
Nebraska	40
New Mexico	30
North Dakota	48
Porto Rico	6
South Carolina	87
Tennessee	32
Vermont	1
Ophthalmia neonatorum:	
Massachusetts	102
New Jersey	2
Porto Rico	4
South Carolina	7
Tennessee	1
Paratyphoid fever:	
South Carolina	5
Puerperal septicemia:	
Porto Rico	10
Tennessee	1
Rabies in animals:	
South Carolina	8
Septic sore throat:	
Massachusetts	19
Nebraska	3
Tennessee	2
Tetanus:	
Massachusetts	4
North Dakota	1
Porto Rico	8
South Carolina	1
Tetanus (infantile):	
Porto Rico	50
Trachoma:	
Massachusetts	4
New Jersey	5
Porto Rico	2
Tennessee	11
Trichinosis:	
Massachusetts	3
Tularæmia:	
Tennessee	1
Typhus fever:	
New Jersey	1
South Carolina	1
Undulant fever:	
Iowa	24
Nebraska	2
New Mexico	1
South Carolina	1
Vincent's angina:	
Iowa	3
North Dakota	14
Tennessee	3
Whooping cough:	
Iowa	58
Massachusetts	773
Nebraska	33
New Jersey	316
New Mexico	13
North Dakota	80
Porto Rico	69
South Carolina	400
Tennessee	122
Vermont	62

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,475,000. The estimated population of the 88 cities reporting deaths is more than 29,880,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended July 5, 1930, and July 6, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	650	968	
95 cities	356	543	568
Measles:			
45 States	5,538	5,001	
95 cities	1,695	1,187	
Meningococcus meningitis:			
46 States	70	137	
95 cities	23	71	
Poliomyelitis:			
46 States	173	29	
Scarlet fever:			
46 States	1,136	1,383	
95 cities	466	526	478
Smallpox:			
46 States	770	647	
95 cities	40	92	23
Typhoid fever:			
46 States	532	515	
95 cities	62	55	80
Deaths reported			
Influenza and pneumonia:			
88 cities	336	359	
Smallpox:			
88 cities	0	0	

City reports for week ended July 5, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	0		0	0	6	0
New Hampshire:								
Concord	0	0	0		0	0	0	0
Nashua	0	0	0		0	5	0	0
Vermont:								
Barre	0	0	0		0	5	0	2
Burlington	0	0	0		0	0	0	0

City reports for week ended July 5, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND—con.								
Massachusetts:								
Boston	22	27	17	----------	1	152	5	10
Fall River	3	2	3	----------	0	1	0	0
Springfield	3	1	1	----------	0	4	1	0
Worcester	2	1	0	----------	0	43	0	0
Rhode Island:								
Pawtucket	0	0	0	----------	0	0	0	1
Providence	9	3	2	----------	0	17	0	2
Connecticut:								
Bridgeport	1	3	0	----------	0	0	0	0
Hartford	0	2	0	----------	0	0	0	0
New Haven	5	1	0	----------	0	3	9	0
MIDDLE ATLANTIC								
New York:								
Buffalo	10	7	3	----------	1	12	5	7
New York	65	171	76	6	4	446	47	72
Rochester	4	5	3	----------	1	1	1	1
Syracuse	4	2	2	----------	0	33	1	2
New Jersey:								
Camden	0	4	0	----------	1	11	0	0
Newark	8	10	8	1	0	26	9	4
Trenton	4	1	0	1	0	9	0	0
Pennsylvania:								
Philadelphia	31	39	12	----------	1	95	26	23
Pittsburgh	14	14	18	----------	1	77	3	12
Reading	1	2	1	----------	0	0	6	1
Scranton	2	----------	1	----------	0	3	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	0	4	2	----------	0	37	8	5
Cleveland	89	19	7	----------	0	8	11	6
Columbus	11	3	2	2	0	10	6	1
Toledo	23	3	0	----------	0	3	10	0
Indiana:								
Fort Wayne	2	2	0	----------	0	1	0	0
Indianapolis	5	2	0	----------	0	10	0	9
South Bend	0	0	0	----------	0	3	0	2
Terre Haute	0	0	0	----------	0	14	0	1
Illinois:								
Chicago	40	67	100	2	1	22	44	22
Springfield	1	1	0	1	1	21	0	0
Michigan:								
Detroit	29	32	31	1	0	65	16	10
Flint	6	2	1	----------	0	42	0	2
Grand Rapids	3	1	1	----------	1	3	0	0
Wisconsin:								
Kenosha	4	0	0	----------	0	2	7	0
Madison	3	0	0	----------	0	6	0	0
Milwaukee	62	9	2	----------	0	22	19	7
Racine	4	1	0	----------	0	11	0	0
Superior	0	0	0	----------	0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0	----------	0	5	1	0
Minneapolis	25	9	0	----------	0	15	0	2
St. Paul	11	6	0	----------	0	3	3	1
Iowa:								
Des Moines	0	1	0	----------	----------	0	0	----------
Sioux City	1	0	0	----------	----------	5	1	----------
Waterloo	0	0	0	----------	----------	0	0	----------
Missouri:								
Kansas City	----------	2	----------	----------	----------	----------	----------	----------
St. Joseph	0	0	0	----------	0	1	0	1
St. Louis	23	17	14	----------	----------	30	8	----------
North Dakota:								
Fargo	4	0	0	----------	0	0	3	1
Grand Forks	0	0	0	----------	----------	0	0	----------

City reports for week ended July 5, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
WEST NORTH CENTRAL—continued								
South Dakota:								
Aberdeen	1	0	0	...	...	25	0	...
Sioux Falls	0	0	0	...	...	0	0	...
Nebraska:								
Omaha	1	2	1	...	0	2	0	8
Kansas:								
Topeka	2	0	0	...	0	3	2	1
Wichita	0	0	0	...	0	5	0	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	3	1	1	...	0	0	0	4
Maryland:								
Baltimore	21	12	4	...	0	7	8	8
Cumberland	1	0	0	...	0	0	0	0
Frederick	0	0	0	...	0	0	0	0
District of Columbia:								
Washington	5	4	5	...	1	43	0	3
Virginia:								
Lynchburg	4	0	1	...	0	6	0	0
Norfolk	1	0	0	...	0	3	0	1
Richmond	3	1	0	...	0	8	1	4
Roanoke	2	0	0	...	1	12	2	1
West Virginia:								
Charleston	0	0	1	...	0	1	0	1
Wheeling	1	0	0	...	0	1	0	0
North Carolina:								
Raleigh	0	0	0	...	0	0	0	0
Wilmington	1	0	0	...	0	0	0	0
Winston-Salem	2	0	0	...	0	1	2	0
South Carolina:								
Charleston	0	0	0	10	0	0	1	1
Columbia	1	0	0	...	0	1	1	0
Georgia:								
Atlanta	...	2	...	...	...	...	...	...
Brunswick	...	0	...	...	...	...	...	...
Savannah	1	1	0	...	0	0	3	1
Florida:								
Miami	0	1	0	...	0	0	1	1
St. Petersburg	...	0	...	...	0	...	...	0
Tampa	0	0	0	...	0	6	0	2
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	3	...	0	1	0	4
Tennessee:								
Memphis	1	0	0	...	0	1	0	7
Nashville	2	0	0	...	0	12	0	1
Alabama:								
Birmingham	1	1	2	1	1	7	1	9
Mobile	0	0	0	...	0	0	0	1
Montgomery	1	0	1	...	...	0	1	...
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0	...	...	0	0	...
Little Rock	0	0	0	...	0	0	0	0
Louisiana:								
New Orleans	0	5	4	1	3	1	0	9
Shreveport	0	0	0	...	0	1	3	2
Oklahoma:								
Tulsa	3	0	1	...	...	0	0	...
Texas:								
Dallas	0	3	2	...	0	2	0	4
Fort Worth	0	1	0	...	0	0	0	1
Galveston	0	0	0	...	0	0	0	0
Houston	0	2	7	...	0	3	0	4
San Antonio	0	1	1	...	1	0	0	3

City reports for week ended July 5, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MOUNTAIN								
Montana:								
Billings	1	0	0		0	2	0	0
Great Falls	0	0	0		0	0	2	0
Helena	0	0	0		0	1	0	0
Missoula	0	0	0		0	0	1	0
Idaho:								
Boise	1	0	0		0	2	0	1
Colorado:								
Denver	7	7	1		0	25	3	4
Pueblo	1	1	0		0	32	6	0
New Mexico:								
Albuquerque	2	0	0		0	0	0	0
Arizona:								
Phoenix	0	0	0		0	1	0	4
Utah:								
Salt Lake City	4	3	0		0	21	4	2
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	11	3	0			53	31	
Spokane	3	1	0			15	0	
Tacoma	5	2	0		0	24	0	2
Oregon:								
Portland	7	5	2		0	12	3	7
Salem	1	0	0		0	0	1	0
California:								
Los Angeles	17	35	13	7	2	103	28	17
Sacramento	0	2	2		0	12	0	1
San Francisco	9	10	1	1	1	16	16	1

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	0	3	0	0	0	3	1	0	0	12	16
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	7
Nashua	0	0	0	0	0	0	0	0	0	0	0
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	7
Burlington	0	0	0	0	0	0	0	0	0	0	6
Massachusetts:											
Boston	31	15	0	0	0	16	2	0	0	41	187
Fall River	1	2	0	0	0	2	1	0	0	4	24
Springfield	2	1	0	0	0	0	0	1	0	3	22
Worcester	3	2	0	0	0	2	0	0	0	4	43
Rhode Island:											
Pawtucket	0	0	0	0	0	1	0	0	0	0	9
Providence	3	4	0	0	0	2	0	0	0	2	53
Connecticut:											
Bridgeport	3	1	0	0	0	3	0	0	0	0	29
Hartford	2	2	0	0	0	0	0	2	0	0	36
New Haven	1	0	0	0	0	2	0	0	0	0	31
MIDDLE ATLANTIC											
New York:											
Buffalo	12	6	0	0	0	11	1	0	0	17	119
New York	*83	48	0	0	0	72	16	8	1	68	1,159
Rochester	3	3	0	0	0	2	0	0	0	2	57
Syracuse	3	4	0	0	0	3	0	0	0	34	34
New Jersey:											
Camden	1	2	0	0	0	0	0	0	0	0	15
Newark	10	8	0	0	0	14	1	0	0	16	87
Trenton	1	5	0	0	0	4	0	2	0	0	27
Pennsylvania:											
Philadelphia	37	25	0	0	0	36	4	1	0	16	421
Pittsburgh	15	17	0	0	0	5	1	0	0	25	136
Reading	1	2	0	0	0	2	0	1	0	9	23
Scranton	1	1	0	0	0	0	0	0	0	5	

City reports for week ended July 5, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	6	7	0	0	0	12	1	0	0	8	102
Cleveland	20	19	0	0	0	12	2	1	0	50	151
Columbus	3	4	0	0	0	1	0	0	0	3	68
Toledo	5	9	0	2	0	5	0	1	0	0	52
Indiana:											
Fort Wayne	1	1	------	2	0	0	0	0	1	1	20
Indianapolis	3	2	3	4	0	4	0	0	0	8	------
South Bend	1	0	0	0	0	0	0	0	0	0	19
Terre Haute	0	0	0	0	0	0	0	0	0	0	10
Illinois:											
Chicago	55	104	2	0	0	45	3	0	1	54	590
Springfield	1	0	0	0	0	1	0	0	0	1	16
Michigan:											
Detroit	42	29	2	0	0	23	3	0	1	57	[illegible]
Flint	4	6	0	0	0	2	0	0	0	[illegible]	18
Grand Rapids	5	3	0	1	0	0	1	0	0	3	25
Wisconsin:											
Kenosha	1	0	0	0	0	0	0	0	0	13	2
Madison	0	2	0	0	0	1	0	0	0	9	26
Milwaukee	11	10	1	1	0	1	0	0	0	51	79
Racine	2	0	0	0	0	0	0	0	0	4	5
Superior	2	0	0	0	0	0	0	0	0	0	7
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	0	0	0	0	2	0	1	0	8	16
Minneapolis	15	7	1	0	0	0	1	2	0	1	71
St. Paul	9	6	0	0	0	1	1	0	0	2	34
Iowa:											
Des Moines	3	1	0	12	------	------	0	0	------	0	30
Sioux City	1	1	0	1	------	------	0	0	------	2	------
Waterloo	1	0	1	3	------	------	0	0	------	1	------
Missouri:											
Kansas City	3	------	0	------	------	------	1	------	------	------	------
St. Joseph	0	6	0	0	0	1	0	0	0	0	18
St. Louis	10	22	1	1	0	6	3	0	0	21	170
North Dakota:											
Fargo	0	0	0	1	0	1	0	0	0	0	14
Grand Forks	0	0	0	4	------	------	0	0	------	0	------
South Dakota:											
Aberdeen	0	0	0	5	------	------	0	0	------	3	------
Sioux Falls	0	0	0	0	------	------	0	0	------	0	6
Nebraska:											
Omaha	1	5	1	0	0	0	0	0	0	0	59
Kansas:											
Topeka	0	4	0	0	0	1	0	0	0	10	15
Wichita	1	0	0	0	0	2	0	0	0	2	41
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	3	0	0	0	1	0	0	0	2	23
Maryland:											
Baltimore	10	16	0	0	0	11	3	3	1	31	158
Cumberland	0	0	0	0	0	0	0	0	0	2	12
Frederick	0	0	0	0	0	0	0	0	0	0	5
District of Columbia:											
Washington	7	4	0	0	0	12	1	0	0	9	126
Virginia:											
Lynchburg	0	0	0	0	0	0	0	3	0	2	15
Norfolk	0	0	1	0	0	1	1	0	0	4	------
Richmond	1	0	0	0	0	5	1	4	0	0	46
Roanoke	0	0	------	0	0	1	0	0	0	0	18
West Virginia:											
Charleston	0	0	1	0	0	0	1	0	0	4	12
Wheeling	1	1	0	0	0	0	1	1	0	0	14
North Carolina:											
Raleigh	0	0	0	1	0	0	0	0	1	0	10
Wilmington	0	0	0	0	0	0	0	0	0	0	14
Winston-Salem	0	1	1	0	0	2	1	1	1	6	26

City reports for week ended July 5, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC—continued											
South Carolina:											
Charleston	0	1	0	0	0	5	1	0	0	0	19
Columbia	0	1	0	0	0	0	1	1	0	2	-
Georgia:											
Atlanta	2	-	1	-	-	-	3	-	-	-	-
Brunswick	0	-	0	-	-	-	0	-	-	-	-
Savannah	0	0	0	0	0	2	2	1	0	0	26
Florida:											
Miami	0	0	0	0	0	3	1	0	0	0	29
St. Petersburg	0	-	0	-	0	0	0	-	0	-	13
Tampa	1	0	0	0	0	2	1	0	0	0	9
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	0	0	0	0	0	0	0	0	0	20
Tennessee:											
Memphis	2	0	0	0	0	5	6	4	0	9	91
Nashville	1	0	0	3	0	2	5	2	0	3	42
Alabama:											
Birmingham	0	2	1	0	0	2	3	7	2	0	88
Mobile	0	0	0	0	0	0	0	1	0	0	23
Montgomery	0	0	0	0	-	-	1	0	-	0	-
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	-	-	0	0	-	2	-
Little Rock	0	0	0	0	0	0	1	0	0	0	-
Louisiana:											
New Orleans	3	10	0	0	0	9	3	8	1	4	129
Shreveport	0	0	0	0	0	4	1	1	1	0	37
Oklahoma:											
Tulsa	0	0	1	2	-	-	2	0	-	0	-
Texas:											
Dallas	2	1	0	0	0	4	2	1	0	0	55
Fort Worth	1	0	1	0	0	1	1	0	0	0	37
Galveston	0	0	0	0	0	0	0	1	0	0	15
Houston	0	0	0	0	0	3	0	1	0	0	82
San Antonio	0	2	0	0	0	7	0	1	0	0	69
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	1	0	0	0	0	4
Great Falls	0	13	1	0	0	0	0	0	0	0	10
Helena	1	1	0	0	0	0	0	0	0	1	2
Missoula	0	0	0	0	0	0	0	0	0	3	3
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	1	3
Colorado:											
Denver	6	1	0	0	0	12	0	0	0	49	81
Pueblo	0	0	0	5	0	1	0	0	0	0	7
New Mexico:											
Albuquerque	0	0	0	0	0	2	0	0	0	0	5
Arizona:											
Phoenix	0	0	0	0	0	3	0	0	2	0	22
Utah:											
Salt Lake City	1	4	0	0	0	0	0	0	0	28	27
Nevada:											
Reno	0	0	0	1	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	4	1	1	2	-	-	1	0	-	10	-
Spokane	2	0	1	3	-	-	0	0	-	10	-
Tacoma	1	1	2	3	0	0	0	0	0	1	29
Oregon:											
Portland	2	0	7	4	0	0	0	1	0	8	62
Salem	0	0	0	0	0	0	0	0	0	1	-
California:											
Los Angeles	15	8	3	6	0	29	2	1	0	27	247
Sacramento	1	1	0	2	0	0	1	1	0	1	28
San Francisco	8	8	0	0	0	15	0	0	0	4	160

City reports for week ended July 5, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Connecticut:									
New Haven	1	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	1	1	0	0	0	0	0	0	0
New York	2	6	0	2	0	0	4	0	0
Rochester	1	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	0	2	0	0	0	0	0	1	0
Pittsburgh	0	2	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati [1]	1	1	0	0	0	0	0	0	0
Indiana:									
Indianapolis	1	1	0	0	0	0	0	1	0
Illinois:									
Chicago	3	2	0	0	0	0	1	0	0
Michigan:									
Detroit	3	1	1	0	0	0	0	1	0
WEST NORTH CENTRAL									
Missouri:									
St. Joseph	1	0	0	0	0	0	0	0	0
St. Louis	1	1	0	0	0	0	0	1	0
North Dakota:									
Fargo	0	0	2	0	0	0	0	0	0
Nebraska:									
Omaha	1	0	0	0	0	0	0	0	0
Kansas:									
Wichita	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC									
District of Columbia:									
Washington	1	0	0	0	0	0	0	0	0
Virginia:									
Norfolk	2	0	0	0	0	0	0	1	0
Richmond	0	1	0	0	0	0	0	0	0
North Carolina:									
Wilmington	0	0	0	0	2	1	0	0	0
Winston-Salem	0	0	0	0	8	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	12	0	0	0	0
Georgia:									
Savannah [2]	0	0	0	0	1	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	4	2	0	0	0	1	0	0	0
Nashville	0	0	0	0	1	0	0	0	0
Alabama:									
Birmingham	0	1	0	1	0	0	0	0	0
Mobile	0	0	0	0	0	2	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
New Orleans	0	0	0	0	1	1	0	0	0
Shreveport	0	1	0	0	0	4	0	2	0
Oklahoma:									
Tulsa	0	0	0	0	0	0	0	1	0

[1] Rabies (in man): 1 case and 1 death at Cincinnati, Ohio.
[2] Typhus fever: 2 cases at Savannah, Ga.

City reports for week ended July 5, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST SOUTH CENTRAL—continued									
Texas:									
Dallas	0	0	0	0	1	4	1	0	0
Fort Worth	0	0	0	0	0	4	0	0	0
Houston	0	0	0	0	0	2	0	0	0
MOUNTAIN									
Colorado:									
Denver	0	1	0	0	0	0	0	0	0
Arizona:									
Phoenix	2	0	0	0	0	0	0	0	0
PACIFIC									
Ca..'or^nia:									
Los Angeles	1	0	0	0	0	0	0	49	4
Sacramento	0	0	0	0	0	1	0	0	0

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended July 5, 1930, compared with those for a like period ended July 6, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, June 1 to July 5, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929
98 cities	76	110	80	106	68	112	67	110	[2] 59	89
New England	86	72	35	79	35	74	62	94	51	70
Middle Atlantic	72	148	82	131	81	125	65	144	59	101
East North Central	113	123	129	145	93	165	98	131	91	128
West North Central	51	96	59	65	34	87	70	85	[3] 33	77
South Atlantic	49	54	40	64	33	64	24	34	[4] 24	34
East South Central	13	21	13	41	13	34	13	34	40	27
West South Central	41	88	86	84	86	65	37	69	52	72
Mountain	17	61	34	35	9	26	0	26	9	26
Pacific	76	56	43	34	54	58	64	84	38	43

MEASLES CASE RATES

	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929
98 cities	955	734	833	483	656	423	500	267	[2] 281	195
New England	1,462	602	1,415	337	1,048	391	762	211	498	209
Middle Atlantic	1,076	169	1,089	143	818	123	640	99	339	76
East North Central	517	1,827	457	1,152	381	1,010	334	620	170	474
West North Central	412	1,060	362	581	658	504	264	256	[3] 154	114
South Atlantic	478	238	362	242	375	129	234	137	[4] 175	73
East South Central	418	41	182	41	270	41	256	7	142	27
West South Central	123	400	101	209	82	183	19	156	26	69
Mountain	5,518	192	3,321	261	2,617	218	1,416	148	712	148
Pacific	2,220	408	1,564	384	1,247	352	931	208	527	138

Footnotes on p. 1743.

Summary of weekly reports from cities, June 1 to July 5, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]—Continued

SCARLET FEVER CASE RATES

	Week ended—									
	June 7, 1930	June 8, 1929	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929
98 cities	213	209	192	188	145	118	109	112	[2] 77	88
New England	230	191	199	204	115	159	121	119	66	90
Middle Atlantic	196	135	155	129	118	100	89	72	57	46
East North Central	296	321	304	322	229	260	184	191	116	173
West North Central	260	165	233	110	118	77	97	104	[3] 114	38
South Atlantic	156	300	145	133	97	73	62	62	[4] 55	60
East South Central	108	96	54	75	67	89	61	34	13	55
West South Central	78	76	37	107	105	88	41	42	49	23
Mountain	189	78	129	70	197	96	60	70	163	44
Pacific	109	270	113	251	85	210	57	161	45	135

SMALLPOX CASE RATES

98 cities	20	8	15	16	10	9	13	15	[2] 7	15
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	1	0	0	0	0	0	0	0	0	0
East North Central	8	17	11	28	8	18	10	38	5	41
West North Central	116	12	53	12	30	6	51	19	[3] 13	13
South Atlantic	4	2	7	4	2	6	9	2	[4] 2	2
East South Atlantic	34	14	40	55	20	0	7	7	20	21
West South Central	22	8	22	42	26	4	22	4	0	11
Mountain	60	52	34	44	34	61	51	113	51	35
Pacific	68	14	57	46	43	31	50	14	38	24

TYPHOID FEVER CASE RATES

98 cities	8	8	9	9	8	8	13	12	[2] 10	10
New England	4	7	9	11	0	4	9	9	7	4
Middle Atlantic	6	5	8	3	4	2	5	7	6	6
East North Central	4	3	4	4	3	4	10	3	1	4
West North Central	9	8	6	17	8	19	13	15	[3] 7	13
South Atlantic	20	17	15	11	22	13	37	30	[4] 28	32
East South Central	13	27	27	34	54	55	67	34	94	48
West South Central	37	27	19	19	26	34	34	34	49	8
Mountain	0	0	9	9	9	9	34	52	0	17
Pacific	2	12	19	19	7	5	5	19	5	7

INFLUENZA DEATH RATES

91 cities	5	7	6	6	4	6	3	5	[2] 4	2
New England	0	2	2	7	2	2	0	2	2	0
Middle Atlantic	4	5	5	4	5	3	2	4	4	3
East North Central	4	6	6	8	4	8	3	4	2	1
West North Central	12	3	15	9	0	6	0	0	[3] 0	0
South Atlantic	9	7	2	2	2	6	5	4	[4] 4	2
East South Central	15	22	15	7	15	15	15	15	7	15
West South Central	11	16	27	12	8	16	11	4	15	4
Mountain	9	35	0	0	0	0	0	44	0	0
Pacific	3	16	6	6	0	6	3	3	9	0

PNEUMONIA DEATH RATES

91 cities	86	90	85	86	74	81	68	64	[2] 55	63
New England	73	65	82	85	69	56	49	58	29	49
Middle Atlantic	106	105	101	98	82	89	75	65	58	67
East North Central	59	96	67	82	53	76	56	69	41	56
West North Central	130	81	77	54	109	48	86	48	[3] 62	63
South Atlantic	93	67	73	88	64	84	66	62	[4] 51	69
East South Central	81	60	110	104	133	119	103	75	162	75
West South Central	84	90	107	62	69	82	92	66	84	109
Mountain	112	61	86	113	129	78	77	104	60	61
Pacific	40	69	71	60	74	104	55	38	64	31

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1930, and 1929, respectively.
[2] Kansas City, Mo., Atlanta and Brunswick, Ga., not included.
[3] Kansas City, Mo., not included.
[4] Atlanta and Brunswick, Ga., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended June 28, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended June 28, 1930, as follows:

Province	Cerebro-spinal fever	Influenza	Polio-myelitis	Small-pox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		4			
New Brunswick					5
Quebec	1				11
Ontario	2	4	1	10	4
Manitoba					1
Saskatchewan					1
Alberta	1				
British Columbia					1
Total	4	8	1	10	23

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended July 5, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended July 5, 1930, as follows:

Disease	Cases	Disease	Cases
Chicken pox	34	Ophthalmia neonatorum	2
Diphtheria	31	Poliomyelitis	1
German measles	3	Scarlet fever	30
Influenza	1	Smallpox	3
Lethargic encephalitis	1	Tuberculosis	60
Measles	36	Typhoid fever	9
Mumps	15	Whooping cough	12

Ontario Province—Communicable diseases (comparative)—Four weeks ended June 26, 1930.—The following table shows the number of cases of certain communicable diseases, with deaths therefrom, reported in the Province of Ontario, Canada, for the four weeks ended June 26, 1930, as compared with the corresponding period of 1929:

Disease	4 weeks, 1929		4 weeks, 1930	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	4	5	11	5
Chancroid	6	0	6	0
Chicken pox	1,366	0	836	0
Diphtheria	239	14	237	7
Erysipelas	2		2	
German measles	36		429	
Goitre	1		1	
Gonorrhea	189		133	
Influenza	17	2	13	2
Lethargic encephalitis	2	1	1	1
Measles	3,077	2	1,319	0
Mumps	463	0	139	0
Paratyphoid fever	2		5	
Pneumonia		158		130
Poliomyelitis	2	2	2	
Puerperal septicemia		1	0	2
Scarlet fever	446	2	511	2
Septic sore throat			1	
Smallpox	87	0	[1] 47	0
Syphilis	158	2	122	
Tetanus				1
Trachoma			1	
Tuberculosis	171	41	129	48
Typhoid fever	66		30	
Undulant fever			11	
Whooping cough	550	1	232	

[1] Cases of smallpox for this period were distributed as follows: Ottawa, 19; Nairn, 12; Sudbury, 6; Toronto, 3; Welland, 3; 1 case in each of the following places, Guelph, Espanola, Sullivan, Napean

CUBA

Habana—Communicable diseases—June, 1930.—During the month of June, 1930, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Death
Chicken pox	11		Measles	1	
Diphtheria	12	1	Scarlet fever	8	
Leprosy	2		Tuberculosis	41	9
Malaria	13		Typhoid fever	15	2

Provinces—Notifiable diseases—Four weeks ended June 7, 1930.—During the four weeks ended June 7, 1930, cases of certain diseases were reported in Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer			4	1			5
Chicken pox	36	41		6	4	3	90
Diphtheria	1	17		1	1	1	21
Malaria		7		1	7	39	54
Measles		6		10			16
Paratyphoid fever	2	7		1		7	17
Scarlet fever		22	2				24
Tetanus (infantile)			1	1			2
Typhoid fever	7	29	9	41	7	12	105

MEXICO

Tampico—Communicable diseases—June, 1930.—During the month of June, 1930, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria		1	Measles	4	4
Enteritis (various)		51	Smallpox	2	
Influenza	3		Tuberculosis	25	21
Leprosy	1		Typhoid fever		5
Malaria	63	13	Whooping cough	2	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	April, 1930: 19	April, 1930: 26	May, 1930: 3	May, 1930: 10	May, 1930: 17	May, 1930: 24	May, 1930: 31	June, 1930: 7	June, 1930: 14	June, 1930: 21	June, 1930: 28	July, 1930: 5	July, 1930: 12
Afghanistan	C																	P[1]
China:																		
Canton	C									1	1	1		2				
Manchuria—Dairen	C		1															
Swatow	C											3	4	3				
India	C	6,461	5,914	10,817	4,947	7,436	15,870	13,209	15,596	14,600	12,468							
	D	3,606	3,371	5,866	2,924	4,345	10,403	10,234	12,782	11,882	9,756							
Bassein	C				3	1	1	2	3	4								
	D				2	1	1	1	3	2								
Bombay	C			4														
Calcutta	C	202	269	354	137	165	165	180	194	175	142	98	78	73	94	77		
	D	110	153	220	85	118	118	93	125	107	83	57	44	36	36	63		
Negapatam	C	12												1				
	D	4												1				
Rangoon	C	3	3	2				1		5	2	2	1	1	2	2		
	D	3	1	2				1		1		2	1	1	1	1		
Tuticorin	C	3																
	D	1																
India (French):																		
Chandernagor	C		4	1	1	2		3	2	2	2					2		
	D		2	3			4	1	1	4	1					1		
Karikal	C		4	12		1												
	D		1	9		1												
Indo-China (see also table below):																		
Pnompenh	C	11	9				2		1				5	10	11	14		
	D	8	7	6						2	2	1	1	4	7	6		
Saigon and Cholon	C	2	5	14	17	12	19	28	59	40	48	13	17	19	7	5		
	D	2	4	6	10	10	13	22	43	27	24	7	11	10	2			

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930			May, 1930					June, 1930				July, 1930	
					12	19	26	3	10	17	24	31	7	14	21	28	5	12
Philippine Islands:																		
Bulacan Province—																		
Malolos	C												1			1		
	D												1					
Santa Maria	C															1		
Cebu—																		
Bantayan	C												3	10	86	86	134	94
	D												3	9	39	43	8	41
Barili	C															1	1	
	D																1	
Bogo	C													1	3	1	23	21
	D													1	1	1	11	9
Cebu	C															20	14	13
	D															9	6	7
Madridejos	C															15	13	3
	D															8	5	1
Medellin	C															1	18	38
	D																6	9
San Remigio	C														3	8	38	23
	D														2	4	8	5
Santa Fe	C												1					
	D												1					
Tobogon	C																	13
	D																	6
Iloilo Province—																		
La Paz	C																	2
	D																	3
Miagao	C															1	1	
	D																2	
La Union Province—Rosario	C																	1
Leyte Province—Maripipi	C													1	15	20		
	D														11	9		
Manila	C										1							

Masbate Province—																		
Catbabayn	C																	4
	D																	1
Cataingan	C															10	20	21
	D															3	4	14
Misami Province—San Miguel	C																	2
	D																	2
Negros—																		
Bacolod	C														9			4
	D														8			4
Binalbagan	C																	9
	D																	3
Cadiz	C											10	2	10	10	3	3	1
	D											7	1	3	5	3	4	1
Escalante	C												1					22
	D												1					7
Calatrava	C														3			1
	D														2			1
Isabella	C																	11
La Carlotla	C															3	1	
	D															1	1	
La Castellana	C															4	3	5
	D															2	3	3
Murcia	D																	3
Pontevada	C																	7
	D																	3
Polupandan	C																	1
	D																	1
Sagay	D																1	
San Carlos	C																	6
	D																	3
San Enrique	C																	5
	D																	3
Silay	C																	6
	D																	6
Talisay	C														7	4		6
	D														7	1		4
Valladelid	C																	3
	D																	4
Villa Hermosa	D																	1
Pampanga Province—																		
Angeles	C														1			
Bacolor	C															1		
Lubao	C																2	
Pangasinan Province—Binmaley	C																2	
Rizal Province—Navotas	C											1						
	D											1						
San Antonio	C													1				
	D													1				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	April 19	April 26	May, 1930: 3	May 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12
Siam	C	3	7	1	8	7	6	8	12	4	6	4		1	6			
	D		4		6	3	2	2	10	2	2	2		1	4			
Bangkok	C	3	2	2	1	5	4	5			6	3	5	3	3	1		
	D			1	1	2	1				2	1		3		2		
Nagara Pathom	C		1				4	6										
	D		1				2											
On vessel:																		
S. S. at Suva, Fiji Islands	C		1															
S. S. Sutley, at Batavia, from Calcutta	C		1															
S. S. Sassari, at Massoua, from Jeddah	C											1						
	D											1						
On small boat at Port Cebu, from Bantayan Island	C												1					
	D												1					

Place		December, 1929	January, 1930	February, 1930	March, 1930: 1–10	March 11–20	March 21–31	April, 1930: 1–10	April 11–20	April 21–30	May, 1930: 1–10	May 11–20	May 21–31	June, 1930: 1–10	June 11–20
Indo-China (French) (see also table above):															
Annam [1]	C		1	4		52				60		20	3	2	14
Cambodia [1]	C	41	147	90	49	32		18	6		5	31	52	56	88
Cochin-China [1]	C	46	177	65	5	22	55	48			188	224	259	147	126

[1] Reports incomplete.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12
Algeria:																		
Algiers	C																1	1
Constantine	C												1					1
Argentina:																		
Andalgala.[1]																		
Rosario	C	P																
Sante Fe	C	6																
Villa Lia	D		2															
Azores: Ponta Delgada	C					1	7											
	D						5											
Belgian Congo	C																2	
	D																2	
Brazil:																		
Rio de Janeiro	C	1																
	D	1																
Sao Paulo.[2]																		
British East Africa (see also table below):																		
Tanganyika	C		7			11	33											
	D					10	10											
Uganda	C	82	47	98	27	20	23	47	54	89								
	D	70	43	87	27	19	21	38	48	75								
Ceylon:																		
Colombo	C	4	3	4			1		4	1		1	1					
	D	4	3	4			1		3	1		1	1					
Plague-infected rats		1	3	2	2			2					1					
Chile: Antofagasta	C	1	1	1				1										
	D			2				1										
Dutch East Indies:																		
Batavia and West Java	C	167	153	124	27	16	20	24	18	33	17							
	D	164	150	122	27	16	20	24	18	33	17							
Plague-infected rats		3	3	3		6	2				3	2	3	1				
Celebes—Makassar	C	1																
	D	1																
Java and Madura	D	317	296	223	59	40	35	48	28	74	36							

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.
[2] 21 cases of plague with 8 deaths reported Jan. 29, 1930, in the State of Sao Paulo, Brazil; 15 of these cases were in the city of Sao Paulo.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12
Ecuador (see table below).																		
Egypt:																		
Alexandria	C	4	1	4			1	1	2	3	3	5	3	6	6	4	8	
	D	1		1			1	1			1	2	2		2	5	2	
Assiout	C						7	7	3	9	2	6	4	2	3		1	
	D						3	2		3	1	1		1		2		
Beheira	C	2		4														
Beni Suef	C			4														
Dakahlieh	C		8	5	2		1	2	3	1	2	5	1					
	D			1						1	1							
Gharbieh	C	1					1											
	D						1											
Girga	C				1													
Minieh	C										6	1	1	1	4	4	2	
	D											1		1				
Port Said	C				1					1	1		1			1		
Greece (see also table below):																		
Patras	C			1											1			
Piraeus	C	1																
Pyrgos	C			1														
Hawaii Territory, Hamaqua, Hawaii: Plague-infected rats															1			
India	C	4,814	5,639	4,087	917	343	535	420	281	188	117							
	D	3,308	3,940	3,344	753	229	517	461	271	205	103							
Bassein	C	1		3														
	D	1		1														
Bombay	C	1	1	7		4			4	1		1	1		2			
	D	1	1	5	1	3	4		1	4					1	1		
Plague-infected rats		28	31	86	20	28	25	35	23	39		19	6	7	8	5		
Madras Presidency	C	27	230	157	12	15	9	8	2		6				2			
	D	13	140	87	6	8	4	1		1	4							
Rangoon	C	3	7	3		3		2		1	3					1		
	D	2	6	3		2	1	1	1	1	1					1		
Plague-infected rats		1	7	3	1	2		1	1	3	1				1			
India (Portuguese)	D								7									

Indo-China (see also table below):																		
Pnompenh	C	1			2			1	1			2	6					
	D	2	13	13	2	1	1				1		5	1		1		
Saigon and Cholon	C	2		1					1				1		1			
	D	2		1														
Iraq: Baghdad	C	6	6	7		2		4	7	11	7	12	12	4	8	4	10	
	D	2	1	4				2	3	5	4	6	7	3	5		5	
Japan: Osaka (vicinity of)—Plague-infected rats		7	6	4	1	1	1											
Kwang-Chow-Wan	C	25	25	7				37		20		14	23		8			
Madagascar: Tamatave (see also table below)	C					1							1					
Morocco	C	4	48	55	14	41	34	32	19	22	18	12	2		1			
	D		13	18	6	26	12	11	11	14	6	3	4					
Nigeria: Lagos	C	6	7	13					1	1			1		3			
	D	6	7	5					1	1			1		3			
Plague-infected rats		44	42	25	3	3	1		2	6	5	4	1					
Senegal (see table below).																		
Siam	C	8	17	16	4		1			1	1	3						
	D	6	13	15	4		2			1		3						
Bangkok	C		1	5						1	1	3						
	D		1	4						1		3						
Nagara Pathom	C	7	5	1	4	3	2	1										
	D	7	6	1	4	3	1	1										
Nagara Rajsima	C	2	2	1		1												
	D			1		1												
Syria: Beirut	C													2	1	1		
Tunisia:																		
Sfax district	C	18	22				1		17			4	6		3			
Tunis	C	6	5	1				4				1		1				
	D												1					
Union of Socialist Soviet Republics:																		
Saisk Region	C												1			1		
	D												1					
Stavropol Region	C												1					
	D												1					
Union of South Africa:																		
Cape Province	C	1	2	1					P									
	D		1	1														
Orange Free State	C	15	11	5	1													
	D	9	3	3														
Transvaal	C	8	2	1														
	D	3		1														
On vessel:																		
At Rio de Janeiro, Brazil, from Argentina	C	1																

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
British East Africa (see also table above):							
Kenya	C	34					
Uganda	C	184	109				
	D	155	99				
Ecuador: Guayaquil	C	4	2	2	0		
	D	2	2		0		
Plague-infected rats		4	2	2	0		
Ecuador (outside of Guayaquil)	C	4					
	D	2					
Greece (see also table above)	C				1		1
Indo-China (see also table above)	C	10	30	27	4		11
Madagascar (see also table above)	C	282					
	D	258					
Ambositra Province	C	128	49	25	14		
	D	111	41	20	12		
Antisirabe Province	C	26	22	38	46		
	D	25	22	36	45		
Itasy Province	C	31		4			
	D	31		4			
Miarinarivo Province	C		25	14	1		
	D		25	14	1		

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
Madagascar—Continued.							
Moramanga Province	C	22	7		3		
	D	21	4	5	3		
Tamatave Province	C	3					
	D	1					
Tananarive Province	C	88	110	52	39		
	D	83	107	52	38		
Senegal:							
Baol [1]	C			18	24	13	
	D			8	12	11	
Dakar [1]	C				2	52	
	D				2	42	
Louga [1]	C		2		33	54	
	D				10	27	
Thies [1]	C	3		3	12	21	
	D			2	9	8	
Tivaouane [1]	C	1		11	71	135	
	D			8	38	69	

[1] Incomplete reports.

SMALLPOX

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930			May, 1930					June, 1930				July, 1930	
						12	19	26	3	10	17	24	31	7	14	21	28	5	12
Algeria:																			
Algiers	C		6	1	5	1					1		2						
Constantine	C		1													1			
Oran	C		5		1														
Arabia: Aden	C	1	1	2	3			1											
Bolivia: La Paz.[1]																			
Brazil: Rio de Janeiro	C	1																	
British Borneo: Sarawak	C		4	19															
British East Africa (see also table below):																			
Tanganyika	C	27	5	49	103			26	31	33	45	55	276						
	D	5		8	7			10	4	3	5	8	54						
British South Africa:																			
Northern Rhodesia	C				9				1										
	D								2										
Southern Rhodesia	C	33	1	6				66		53		42	60	75					
	D	6						1		4		8	1						
Canada:																			
Alberta	C	16	22	4	10	3	1												
Edmonton	C	15	19	1	4	3													
British Columbia—Vancouver	C	17	16	16	20	8	1	5	3			2	2	1	1				
Manitoba	C	8	6	2	4	2			2			7	3			4			
Ontario	C	51	63	86	100	17	30	18	12	14	24	21	20	14	10	13	10		
Fort William	C		4																
North Bay	C		2	1						1									
Ottawa	C	7	10	11	19	8	4	7	2	3	10	7	5	6		8	1	1	1
Toronto	C		2									3	1	2	1	1			1
Quebec	C	3	11														4	3	
Montreal	C		1																
Saskatchewan	C	61	86	76	47	3	10	7	21	20	6	10	3		12	10			
Regina	C	31								1		3							
Ceylon:																			
Angoda, Western Province	C			10					6										
	D			1					2										
Colombo	C	1	1	3															
	D			2															

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930 12	April, 1930 19	April, 1930 26	May, 1930 3	May, 1930 10	May, 1930 17	May, 1930 24	May, 1930 31	June, 1930 7	June, 1930 14	June, 1930 21	June, 1930 28	July, 1930 5	July, 1930 12
China:																			
Canton	C	5	7	11	6		2	1						1					
	D		2	3	2	1	1		1										
Chungking	C	P	P	P		P	P	P	P	P		P	P	P					
Foochow	C	P	P	P			P		P		P		P						
Hong Kong	C	102	118	62	38	20	7		1	5	5	2		2	1	1			
	D	73	109	51	25	11	9	3		4	2	3		1		1	1		
Manchuria—																			
Harbin	C	1	3				1				10	10							
Kwantung—Dairen	C	1	6	5			1		1	1		7			11	5		8	
	D											4				1			
Nanking	C	P	P	P	P	P			P	P			P	P	P				
Shanghai—																			
Foreigners only	C	7	5	2	2	2	1				1	1		1	1	1	2	1	
Including natives	D	6	8	7	10	4	3	2	1		1	2	2	1		1	1		
Swatow	D	2	3	6	6	2			1	1		1	4	1					
Tientsin	C	2	1	1	2	1			1	1									
Chosen (see table below).																			
Colombia:																			
Baranquilla	C	1		102	2	1													
Buenaventura	C	13		1		7	5	2	1	2		1	1	1	1				
Costa Rica:																			
Port Limon	C					1	1	2	2				2	2					
San Jose [1]	C				10	7													
Curacao (alastrim)	C				14			1	1	2					1				
Dahomey (see table below).																			
Dutch East Indies:																			
Belawan Deli	C	1																	
Borneo	C		1		185	17	43	20	10		10	4							
	D		1		12	16	12	2	1	1									
Java—																			
Batavia and West Java	C	17	14	14	78	30	25	8	1	1		5	1		1				
	D	10	7	7	6	6	1	3	1	1		3	2		1				
East Java and Madura	C							4											

Sanggi Islands	C	17	25	12	5		43	51	66	14	12								
	D	3			1		2	9	13	1	4								
Sumatra	C	1	2		48														
	D				5														
Egypt: Port Said	C		2			1					1								
Great Britain:																			
England and Wales	C	1,005	1,455	1,530	1,700	423	345	353	306	462	324	304	327	237	266	241	182		
Ashton under Lyne	C	3	4	29	15	9	3	4	2	6	3	4	4			3	4		
Bradford	C	8	5	2		1			2		1		1						
Cardiff	C				2	1	2												
Leeds	C		6	11	16	1	1												
London	C	480	597	699	710	169	169	129	137	222	138	148	129	130	136	125	107		
London and Great Towns	C	799	1,101	1,156	1,239	308	264	265	229	339	250	235	254	197	208	190	158		
	D		2	5	3	2	1	1											
Sheffield	C				8	1	1												
Stoke-on-Trent	C	12	12	41	122	17	23	33	12	19	9	13	21	3	10	15	4		
Scotland	C													1		3			
Greece: Patras	C	1																	
Hedjaz	C	11	11																
India	C	12,789	26,524	36,036	39,329	10,319	7,786	8,385	8,353	6,533	6,549	5,416							
	D	3,730	6,186	7,710	9,109	2,064	1,543	1,779	1,597	1,449	1,814	1,196							
Bombay	C	119	342	638	718	143	114	89	84	52	68	58	40	36	35	23	19		
	D	57	164	314	431	88	78	64	44	33	49	44	35	27	23	19	10		
Calcutta	C	88	185	309	361	153	116	122		109	70	52	71	56	45	45	25		
	D	62	130	287	305	124	97	103		94	72	40	52	50	37	29	30		
Cochin	C	234	234	184	291	56	49	58	20	13	8	7	9	4	1	10	1		
	D	20	27	29	35	3	4	6	2	5	1	2		2	1	1			
Karachi	C	17	30	38	33	10	9	7	4		6	7	1	5		1	1		
	D	11	9	16	47	10	3	2	2	2		1	1	2		1			
Madras	C	85	105	159	173	55	26	27	25	21	13	15	20	9	10	8	8		
	D	16	16	29	36	6	6	5	10	4	5	6		6	3	1			
Moulmein	C	18	65	143	146	10		33		27	29	20	13		9	6	6		
	D	9	18	40	41	4		3		4	6	5	6		3	3	1		
Negapatam	C			1								1			1		1		
Rangoon	C	2	7	7	10		1	1	2	2		3	1	1	5	1	2		
	D		4	2	5					1						1	1		
Tuticorin	C		3									5				1			
Vizagapatam	C	2	5	9	69	1		2	3	3	1	1			1				
	D			1	18	1			1		3								
India (French):																			
Chandernagor	C		3	11	6	4		6		6	2	8	8	4	8				
	D			5	2			2		2	4	1							
Karikal	C		3	12	24	8	9	2		6	5	1		4	3				
	D		3	8	7	3	3	2		2	1			2	2				
Pondicherry Province	C	20	22	52	21	12	1	11		9	13	10	8	4	4				
	D	19	19	40	13	11	1	8		7	12	10	7	4	4				
India (Portuguese)	C		16	50	38	5	6	15	17	2	27	5	13						
	D			6	2			5	3		3	1	4						

[3] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	April 19	April 26	May, 1930: 3	May 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12
Indo-China (see also table below):																			
Pnompenh	C									1		1	1						
	D		1				1	1						1					
Saigon and Cholon	C	4	3	4	3			4	1	1	1		1	1					
	D	2	3	2	1		1	3	1		1		1						
Iraq:																			
Baghdad	C	16	7	3		1	2	3	2	1				1				1	
	D	5	3	1					1	1									
Basra	C			1					1										
Mossoul Liwa	C	80	26	12			22			13		8			1		3	47	
	D	3	7	2			3			2		1			1			19	
Ivory Coast (see table below).																			
Jamaica	C												2						
Japan: Tokyo	C								1										
	D								1										
Macao	D			2	3	1			1	1									
Mexico (see also table below):																			
Jalisco (State): Guadalajara	D	9	9	14	22	6	4	8	2			6	1	4		5	6	3	
Juarez	C	3	2	3	2											6			
	D	2	1	1												1			
Mexico City and surrounding territory [3]	C	25	30	38	106	36	19	20	24	30	15	17	18						
	D	4	7	21	31	14	8	14	11	6	12	8	6						
Morelos State.[4]																			
Progreso	C											1							
	D											1				1			
San Luis Potosi	C			1															
	D			1															
Morocco (see table below).																			
Netherlands: Rotterdam	C	1																	
Nigeria (see also table below): Lagos	C	2	5	2	1	1											1		
	D	1	2																
Persia (see table below):																			
Philippine Islands: Sarangani and Balut Islands[5]	D	40	18	3															
Poland	C	2		2				2	5		1		2						
Portugal: Lisbon	C	6	4	7	7	2	3	3		6		2		1		2	7		
Rumania	C		1	1	2														

Siam	C	42		2		2	2	2	2	2									
	D	9	1				2	2											
Somaliland, British: Boales	C	5	35	19	2														
	D	9	8	2	6														
Spain	C														4				
Straits Settlements	C		2		5	2	1		2	1	3	2	5	5		1	3		
	D		1		1	1			1		1	1	1	1		1			
Sudan (Anglo-Egyptian)	C	290	230	79	60	2	9	31			5	13	1	4	8	1	54	8	1
	D	65	34	6	5	1		3				1	1				3		1
Sudan (French) (see table below).																			
Syria (see table below).																			
Tunisia: Tunis	C	20	7	3	3			1	3		1		1			2			
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P		P		P	P	P	P						
Orange Free State	C	P	P	P	P														
Transvaal	C	P	P	P	P														
Upper Volta	C			26	2	2		1					1						
Zanzibar	C				13														
On vessel:																			
S. S. Tairoa, at Liverpool, from London	C			1															
S. S. Karagola, at Zanzibar, from India	C		4																
S. S. Karagola, at Lourenco Marques, from India	C			1															
S. S. Elysia, at Port Sudan, from Bombay	C						1												
S. S. Naldera, at Port Said	C									1									
S. S. Manoa, from Honolulu to San Francisco	C																1		

Place		December, 1929	January, 1930	February, 1930	March, 1930			April, 1930			May, 1930			June, 1930	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Belgian Congo	C	74													
	D	4													
Dahomey	C	19													
Indo-China (see also table above)	C	142	460	434			26	261				173	132	80	133
Ivory Coast	C					7									
Sudan (French)	C	17	229	213		200	409	371		150	40	56	178		
	D		25	11		18	31	30		6	7	7	18		
Syria: Beirut	C	25	70	18	4	8	5	10	2	7				6	1
Taiwan: Taihoku	C			43	31	12	15	10	2						

[3] During the month of March, 1930, 100 cases of smallpox were reported in Mexico City, Mexico, and surrounding territory.
[4] Newspaper reports of Feb. 4 show an epidemic of smallpox in Ionacatepec, Morelos State, Mexico, and vicinity, giving 600 deaths in preceding 2 weeks.
[5] On Feb. 1, 1930, 317 cases of smallpox with 102 deaths were reported to that date in the Sarangani and Balut Islands.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
British East Africa (see also table above):								Mexico: Durango (see also table above)	D	4	12	6	5	4	4
Kenya	C	168	12	12	175	174		Morocco	C	84	29	74		10	18
Uganda	C		184	109			78	Nigeria	C	293					
	D		155	99			69		D	70					
Chosen	C		1	4		5		Persia	C	P					
	D			1		1		Turkey	C	883	215	114		3	16
France	C	9	9	23	8		3		D	457	66	42			

TYPHUS FEVER

[C indicates cases; D, deaths: P, present

Place		Dec. 15, 1929–Jan. 11, 1930	Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21	28	July 5, 1930
Algeria:																		
Algiers	C	14	3	4	6	2	3	2	1	1	2	4	8	2		1		
Constantine Department	C	2	4	5	11	4	9	2			4		2	11		1		
Oran	C		2										3				4	
Arabia: Aden	C				1													
	D				1													
Bolivia: La Paz.[1]																		
Brazil: Porto Alegre	C	1		2						1								
Bulgaria	C	41		13	9	15				1		5		1		9	6	
	D	2		1		1				1				1				
Sofia	C		1															
Chile:																		
Talcahuano	D		1															
Valparaiso	C		1															
China:																		
Manchuria—Harbin	C			1	4	5		20	27									
Shanghai	C				1													
Tientsin	C	1	1															

Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C							1								1		[1]
Assuan	C	9																
	D	1																
Beheira Province	C	7	14	18	2			2		9	21	9	10	17	16	7	5	
	D			5						4	4	4	1	1	1		2	
Cairo	C			1														
Dakahlieh	C	11																
	D	2																
Port Said	C		2	1														
Suez	C		1															
Great Britain: Scotland—Glasgow	C										1							
	D										1							
Greece (see table below).																		
Iraq: Baghdad Liwa	C	1			2													
	D	1																
Ireland:																		
Irish Free State	C	1																
Ballina—Mayo County	C												2		1			
Dingle—Kerry County	C							3	2									
Mohill—Leitrim County	C																9	
Shillelagh—Wicklow County	C														1		3	
Swinford—Mayo County	C										7	7						
Northern Ireland—Cookstown	C			3														
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico: Mexico City, including municipalities in Federal District	C	6	12	9	4	2	1		1		2		4					
	D	2	4		1	2	1		1				3					
Morocco	C	6	23	21	38	6	5	3	1	3	6	1	1	1		6	8	
	D				7	2	1											3
Palestine	C			1	6		1				2			2				
Poland	C	61	206	183	225	59	64	53	67	64	45	34	28			26	37	
	D	4	21	8	13	4	2	3	6	2	2		1			2	3	
Portugal:																		
Lisbon	C								4									
Oporto	C			1	2	1												
Rumania	C	82	211	293	185	71	46											
	D	5	25	23	12	1	9											
Spain: Valencia	C														2			
Tunisia	C	2		3						2	2	1	1			2		
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P			P	P	P	P					
Natal	C	P	1	3	P	P	P	P		P	P		P					
Orange Free State	C	P	P	P	P					P	P	P	P					
Transvaal	C					P	P	P										
Yugoslavia (see table below).																		

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
Chosen: Seoul	C	1		17		3	
Czechoslovakia	C		10	2	42	29	
France	C	1					
Greece: Athens	C	6	12	6	3	1	3
Latvia	C	2	18				
Lithuania	C	5	2	70	62	73	27
	D	1		5	4	4	
Turkey	C	4	2	3	1	3	16
Yugoslavia	C	6	26	33	46	22	16
	D	1	3	5	2	4	1

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
Dec. 21, 1929	1
July 10, 1930	1
Liberia, Monrovia, June 3, 1930	1

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SPECIAL ARTICLES

Decrease of Hookworm Disease in the United States
Report on the Plan for a Morbidity Reporting Area
Comparative Current State Mortality Statistics

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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DECREASE OF HOOKWORM DISEASE IN THE UNITED STATES[1]

By C. W. STILES, *Chief of Division of Zoology, National Institute of Health (formerly Hygienic Laboratory), United States Public Health Service*

In response to an invitation to discuss hookworm disease, I invite your attention to a brief consideration of three headings: I, Decrease of hookworm disease in various States; II, The carrier problem; III, Generally recognized and approved measures of hookworm control.

I. DECREASE OF HOOKWORM DISEASE IN THE VARIOUS STATES

My original estimate of hookworm infection in our Southern States was approximately 30 per cent of the rural population. The financial support to the State boards of health of 11 Southern States by the Rockefeller Sanitary Commission (1915, Fifth Report, for 1914, p. 30) developed the fact that—

1,087,666 persons (all ages), 1910–1914, showed an infection of 33 per cent;[2]
548,992 of these, who were of school age, showed an infection of 39.5 per cent.

According to the eleventh report, 1925 (for 1924), p. 130, of the International Health Board, the statistics for 1910–1921, inclusive, were as follows:

1,413,000 persons examined showed an infection of 36.7 per cent;
31,603 of these (examined in 1921) showed an infection of 32.3 per cent.

These statistics include selected and unselected cases and figures based on various methods of technique (smear, sedimentation, flotation, centrifuge); accordingly, they are not absolutely comparable to the decimal in judging increase or decrease. The important thing that they indicate is that in 1921 hookworm infection was still very common in our Southern States. A conclusion that the results of the campaign are to be judged solely by the difference between 33 per cent (or 38.9 per cent [2]) (in 1910–1914) and 32.3 per cent (in 1921), namely, an apparent reduction in the percentage of 0.7 (or 6.6 [2]) is not

[1] Presented at the Forty-fifth Annual Conference of State and Provincial Health Authorities of North America, Washington, D. C., June 20, 1930 (held jointly with the Twenty-eighth Annual Conference of State and Territorial Health Authorities with the United States Public Health Service).

[2] The International Health Board Report, 1925 (for 1924), p. 130, gives 1,179,406 persons examined, 38.9 per cent infected. The reason for change of figures is not stated.

well founded. The facts, obvious to any clinician who is in a position to draw a comparison, are that the severe cases had been reduced tremendously in number and that numerous medium and light cases and numerous carriers still existed in 1921.

From October 23, 1929, to January 9, 1930, one of my assistants, C. E. Baker, examined for intestinal parasites 73 unselected boys in the National Training School, Washington, D. C. Of these, 67 came from the hookworm area, as follows:

State	Number examined	Number hookworm positive	State	Number examined	Number hookworm positive
Alabama	7	3	South Carolina	3	
Arkansas	2		Tennessee	2	
Florida	1	1	Texas	6	1
Georgia	5	2	West Virginia	11	2
Kentucky	7	4			
Louisiana	3		Total	67	23
Mississippi	3	1	Percentage		34.3
North Carolina	17	10			

None of these cases was severe; some were clinical "suspects"; on several of them I would have been willing to make a definite diagnosis of hookworm disease on the basis of physical examination, independent of the microscopic examination, but with the aid of the case history.

The total number, 67, is small, and the numbers (1 to 17) for the separate States are smaller. As a basis for percentages to be applied to any State, these figures would be statistically absurd; but a conservative interpretation of these data justifies certain very definite conclusions, namely,

(*a*) Among boys of school age hookworm infection is still widespread, geographically, in our Southern States.

(*b*) If one wishes to press for a more exact statement than hookworm "infection," the definite statement is justified that both hookworm patients and hookworm carriers still exist. In other words, hookworm disease has not disappeared from our Southern States.

(*c*) Compared with the rate of infection in children of school age, 1910–1914 (39.5 per cent), as judged by statistics on infections, this particular group of 67 boys shows 34.3 per cent, a decrease of about 5 per cent when the percentage is drawn on the number examined, or about 13 per cent when the percentage is drawn on the number of infections. This seeming decrease is suggestive, but the group (67) is altogether too small to be taken seriously as a basis for definite statistical conclusion.

Additional very recent (1929) data were obtained in reply to a letter addressed to the southern State boards of health, requesting information regarding their statistics for 1929:

Microscopic examinations, various techniques, by State boards of health

State	1910–1914 [1]			1929			Information supplied by State board of health by—
	Number of persons examined	Hookworm positive		Number of persons examined	Hookworm positive		
		No.	Per cent		No.	Per cent	
Alabama	52, 742	21, 974	41. 8	46, 036	16, 609	36. 9	Dr. D. L. Cannon
Arkansas	52, 970	10, 505	19. 8	[2] 1, 304	697	53. 4	Dr. C. W. Garrison.
Florida	[14, 848	7, 637	51. 4]	29, 515	9, 456	32. 0	Dr. Henry Hanson.
Georgia	73, 278	44, 347	60. 5	11, 172	3, 477	31. 1	Dr. T. F. Sellers.
Kentucky	128, 030	42, 682	33. 6	1, 374	305	22. 2	Dr. L. H. South.
Louisiana	55, 002	24, 601	44. 7	(3)	(3)	(3)	
Mississippi	166, 623	56, 814	34. 1	9, 232	1, 756	19. 0	L. Pittman.
North Carolina	278, 664	82, 449	29. 6	(3)	(3)	(3)	
South Carolina	58, 787	20, 403	34. 8	(3)	(3)	(3)	
Tennessee	75, 667	20, 186	26. 6	20, 107	1, 743	8. 7	Dr. E. L. Bishop.[4]
Texas	63, 376	17, 790	28. 0	(5)	(5)	(5)	Dr. J. C. Anderson.
Virginia	82, 527	17, 189	20. 8	2, 648	91	3. 0	Dr. G. F. McGinnis.
[West Virginia [4]	(3)	(3)	(3)	[6] 375	[6] 209	55. 7	E. I. Parsons.]
Total [1]	1, 087, 666	358, 954	33. 0	121, 388	34, 134	28. 1	

[1] Publication 9, 1915, p. 30, Rockefeller Sanitary Commission except for Florida.
[2] School children, 1 county.
[3] No report.
[4] "July 1, 1929, to June 30, 1930. This information is to be used by Dr. A. E. Keller in a paper that he is preparing for publication from the State department of health and the department of preventive medicine of the Vanderbilt University Medical School. * * * The information does not depict the State situation as a whole, since unquestionably the picture is distorted as yet by the fact that more examinations have been made in counties with a high-infestation than in counties with a low-infestation rate."
[5] No State record.
[6] Included duplicates; omitted from the totals.

The total percentages in the foregoing table are not strictly comparable. What the figures for 1929 mean to the "old timer," the one point they are intended to illustrate, is that hookworm infection is still widespread geographically in the Southern States. The experienced southern clinician knows that with this widespread infection he can expect a great variation in intensity, while the epidemiologist knows that with an increased (or decreased) numerically and geographically widespread infection there is a greatly increased (or decreased) mathematical probability of fresh infection among the already infected, and of new, initial infections among the noninfected; other things being equal, the general tendency (subject of course to exceptions according to local conditions) is toward a geometrical increase in number and severity of the infections with an arithmetical increase in number and density of the population under consideration[3]; and, conversely, with the decrease of infection, either by complete cure (resulting in a decrease of the number of persons who can spread the contagium) or by partial cure (resulting in a decrease in the amount of contagium which other persons can spread), other things being equal, the natural

[3] Theoretically, 1 infected person living in isolation can spread 1 infection to 1 person; 2 infected persons can spread 4 infections to 2 persons; 3 infected persons can spread 9 infections to 3 persons; 4 infected persons can spread 16 infections to 4 persons, etc.

tendency is toward lighter and fewer infections, or a change from infestations[4] (heavy infections) to light infections (including also carriers).

It is to be noted that these statistics are on "infections"—not on "intensity," "worm burden," or clinical data.

Several recent authors do not seem to attach much importance to "incidence of infection" (number or per cent found infected in a given number of persons examined). For instance (to quote only two authors):

> One of the most important developments in the investigations of hookworm infections in recent years has been the realization that mere information concerning the incidence of infection is inadequate for a correct estimate of the extent to which a community is affected by hookworm. (Chandler, 1929, Amer. J. Hyg., vol. 9, p. 480.)
>
> The effects [of the parasite] are so striking that public health administrators fell into the error of considering that every person infested [*read* infected] with hookworms had hookworm disease. (Smillie, 1928, Nelson Loose-Leaf Medicine, p. 347.)

It is perhaps not unnatural that some of the later authors, not connected with the early work, have inadvertently fallen into this error in interpreting the early data.

When the work was first initiated in this country, two rather radically different plans were carefully considered—

(*a*) To campaign first the heavily infested counties (for instance, sand localities), leaving the lightly infected (i. e., clay) counties to the last.

(*b*) To campaign alternately in different parts of the respective States.

Under the first plan more prompt relief would have been extended to a greater number of severe individual cases, but the greatest ultimate good might have been seriously delayed, for the published sand-county statistics would have averaged so high that even had they not tended toward economic depression in the South, they would have been challenged and ridiculed by the clay counties, and thus the work might have met with unnecessarily increased opposition.

The second plan, alternating more or less irregularly from sand to mountain and to clay counties, impressed upon the people that there was a great variation in the different counties, and coincidently the publication of widely different percentages of infections tended to

[4] The use of the term *infestation* in recent literature on hookworms is not entirely in harmony with its exact meaning. It is derived from the Latin *infestare* and implies molestation, *large numbers*, unsafe, danger. Thus, to speak of "healthy carriers" as cases of "*light* infestations" is, classically, either to use a contradiction in terms or to admit the carrier as unsafe or dangerous (a view not in harmony with the policy of some of the authors who speak of "light infestations"), or at least to use the word ambiguously; the expression "out-patient clinic," now tolerated because of general usage, is a similar case of misuse; a *clinicus* is a person who attends sick persons in bed and is derived from the Greek ὁ κλινικός, based on ἡ κλίνη, a bed or couch. I am not defending academic purism but rather contending for as exact use of words as feasible.

impress the public with the fairness of the work; further, had the work been done solely according to areas of severer infection, it would have brought far less support to the State boards of health, and thus the most important by-product of the campaign would have been lost.

To assume that the early campaigners accepted all hookworm cases as clinically identical and all counties (sand, clay, mountain) as equally affected is an erroneous deduction involving an inadvertent confusion of symptomatology and soil distribution with administrative policy.

II. THE CARRIER PROBLEM

There seems to be an impression conveyed in some of the recent literature that the recognition of carriers *versus* patients in hookworm infection is a very recent development. This impression inadvertently overlooks the world's literature on hookworm disease. The early workers both in this country and abroad were fully aware that some persons were carriers and that others were patients.

We never considered it poor policy to treat carriers, and we did not feel that they or frank patients should be discouraged from or prejudiced against taking treatment to a complete cure. The word "carrier" is a relative term, and any day, from either of two causes (decreased resistance on the part of the person or maturity of young worms), the carrier may become a patient. Further, the carrier is a potential danger to both the infected and the uninfected, and we saw no valid reason why he should be officially encouraged to remain a danger. And, thirdly, even a light hookworm infection might be the "last straw" in a case of typhoid fever, tuberculosis, diphtheria, or some other condition. In the early campaign in this country the general principle obtained that treatment was directed primarily toward promptly bettering the condition of the sick, secondarily toward decreasing the danger of spreading the infection, while sanitation was viewed as the fundamental (though by no means the only) factor in the carrier problem. This was frequently expressed in the field as "80 to 90 per cent sanitary privy, 20 to 10 per cent thymol and epsom salts."

In recent years a new point of view has developed, involving two of the three premises on which one of the newer methods of campaign is based, namely, the carrier and the partially cured patient are actually discouraged from and prejudiced against taking treatment. In marked contrast to this, the point is emphasized quite generally that, in justice to the community, physicians who have patients under treatment for malaria should continue the treatment until the patients cease to be carriers, namely, until their blood is plasmodium free.

Thus, contrary to the judgment of various health officers of wide experience, a double public health standard is being urged between

his (or her) weight (to 260 pounds) in about 20 quarters, namely, about 5 years—a *reductio ad absurdum.*

Statistical studies are exceedingly tempting, interesting, and suggestive, but naturally they are subject to check and double check and to interpretation from different viewpoints before they are accepted as convincing. Weight is a "measurable" factor; and while treatment for hookworms usually results in an increase of weight, a pretreatment weight below a "standard" weight for a given age-height-sex group in a hookworm patient may or may not be due to the hookworm infection. For instance, Clark, Sydenstricker, and Collins (1924, Public Health Reports, vol. 39, p. 520), cited—

> Five hundred and six children * * * all native white of native parentage and native grandparentage, without physical defects and * * * judged as of "good" or "excellent" nutrition on clinical evidence * * *.
>
> According to the Baldwin-Wood standard based on the weight for height at different ages for each sex, 81 (16 per cent) of these 506 children who were found to be in good health and free from physical defect on medical examination were more than 10 per cent underweight. Among the children classed on clinical evidence as of "excellent" nutrition, 2 per cent were underweight; but among those of "good" nutrition, 22 per cent were underweight. Both groups, it should be remembered, were above the average as measured by clinical evidence as ascertained by a medical examination.

Even if one judges hookworm disease in either children or adults by the mean average of "measurable" factors (such as weight, which presents so great variation in individuals at different ages that one individual of sub or super average weight may invalidate the mean average of a small group), the available data do not lead to the conclusion that an infection of less than 100, or less than 50, or even less than 25 hookworms is not worth treating from the standpoint of either the patient or the community.

But far more important than this, in case of the child or the adult, various factors, such as the complexion, delayed pilosity, aches, dizziness, epigastric tenderness, lassitude, insomnia, constipation, delayed maturity, irregular menses, frigidity (with its possible medical and legal results and resulting decrease in birth rate), and many other nonmeasurable factors in hookworm disease are to be considered according to their significance at different ages; and many of us "oldsters," who look upon symptoms as not beneath our notice, have seen patients improve in health after expelling less than 25 hookworms.

In summary, the Pythagoristic standardization of carriers versus patients predicated on hookworm oology and used as basis in the very interesting studies conducted in Alabama should (from my viewpoint) be restudied, checked and double checked, both from the standpoint of objective and subjective, measurable and unmeasur-

able factors, and until fully confirmed should not be taken as justifying health officers in assuming a position that light cases of hookworm infection (either carriers or partially cured cases) are to be ignored clinically or to be discouraged from or prejudiced against treatment.

III. GENERALLY RECOGNIZED AND APPROVED MEASURES OF HOOKWORM CONTROL

My third topic, dealing with measures of hookworm control, is a "request number."

For many years past I have not been actively engaged in the hookworm campaign—hookworm work was only one incident in my life; but I have followed the newer literature with interest and with a background of practical field work. As a result I am impressed by the rather well-recognized principle that each generation "audits the accounts" of earlier generations.

New workers in a field frequently have new thoughts, new technique, new viewpoints, and new conditions, as compared with their predecessors of one or several decades earlier; and, in a spirit of friendly reciprocity, these new factors are subject to audit by the predecessors belonging to older but still living generations. Expressed in the vernacular, the "youngsters" audit the accounts of the "oldsters"; but Oslerizing "oldsters" have the privilege, at least for their own reminiscent satisfaction, of checking up the accounts of the "youngsters."

Hookworm control measures do not depend to any great extent upon new procedures or new observations, but rather upon the selection of well-known procedures adapted to the local conditions under which they are applied; they are borrowed from private, dispensary, hospital, and veterinary practice, from school, factory, and mine inspection, and from restaurant and general sanitary inspection.

Special combinations of details have been emphasized by various authors and designated under special names. Thus, we have the original miners' medical service plan, dispensary plan, intensive method, mass treatment, and one which, in contradistinction to clinical study, can best be described as the oological [6] or the quasi-mathematical [7] or the Pythagoristic [8] plan.

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[6] Oology, the science of eggs in relation to their coloring, *number*, shape, and size.

[7] It is to be recalled that the Latin *quasi* (as it were, "partly") is fundamentally different from the Latin *pseudo* (derived from the Greek ψεύδω, to cheat by lies, the original sense probably being that of whispering); quasi mathematical implies error, pseudo-mathematical would have a tinge of implication of falsification in the sense of intentional deception; it is needless to state that I have selected intentionally the quasi rather than the pseudo.

[8] It will be recalled that Pythagoras and his early followers enunciated the doctrine that "all things are numbers."

The principles adopted in the recently proposed oological plan, as applied in Alabama,[9] are that—

1. Symptoms of the individual (for instance, the extremes) are definitely ignored in favor of the mathematical mean average of the group;
2. A cross section of the population is classified on egg count reduced by two successive formulæ, to an estimate of the number of worms;
3. In localities in which the average [*not individual*] egg count [*not the symptoms, or the obvious condition of the families*] is considered sufficiently indicative, on an assumed constant of the exceedingly variable eggs per gram feces, the white school children are egg counted individually, but cotton-mill children seem to be given only secondary, if any, consideration;
4. Children whose egg counts indicate the presence of an equally inexact (though conceivably uniform) estimate of 1 to 24 [10] worms are *eliminated* from health office treatment and *discouraged* from private treatment; but
5. Children whose egg counts indicate an equally inexact (but an equally approximate) estimate of 25 [11] worms or above, are given treatment sufficient to reduce the infection below 25 [11] worms, and then *eliminated* from further board of health treatment and *discouraged* from private practice treatment.
6. The county health officer meets these children patients [estimated as harboring 25 hookworms or more] at the school at 7 a. m. and administers one standard treatment to them. This process is considered as a part of the general program of correction of defects of school children and is repeated from year to year, "thus holding the intensity of the disease below the point where it is of economic importance to the community." "Economic cure" is stressed rather than humanitarianism; and if one is to judge by the published presentation of the plan, the child's parents and the family physician are not considered in the matter, but the county health officer becomes an official community physician, dispensing a potentially poisonous drug.

As I interpret the literature, there has been no change during the past 50 years or more in the nature of the three basic premises of hookworm control, namely,

(1) The free contagium, i. e., the potentially infectious material, is to be found in its greatest concentration in the fecal material at the moment this leaves the intestine; ergo, it is more

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[9] Nelson Loose-Leaf Medicine, 1928, p. 363, et al.

[10] In the paper presenting the premises the range "1 to 25" is selected, but in the later paper giving details of the plan of campaign recommended to health officers the range "1 to 24" is the number selected as basic.

[11] See footnote 10.

logical to utilize this moment for intensive attack in prevention than to wait until the contagium is scattered broadcast.

(2) Hookworms can be expelled from the intestine by use of certain drugs; ergo, medicinal treatment can be used for two distinct purposes, namely, to improve the condition of the patient and to help protect the community from constant infection.

(3) Civilization was not made in a day, and the practical application of both ergos just cited varies tremendously according to the mental attitude of the people among whom the work is carried on and of the person carrying on the work. This third point leads to the conclusion that there is no "best" method of procedure applicable under all circumstances, among all individuals, in all communities, by all field workers.

Fecal collection.—No specialized type of fecal collection has, or probably ever will be, developed which is of world-wide, nation-wide, race-wide, or state-wide applicability. Since the time of Moses, the patriarch of rural sanitation, and continuing during the days of his Lumsdenian [12] successor, the tendency of studies in fecal collection has developed along centrifugal lines (into variation) rather than centripetal (toward uniformity). The thought that any one type of privy [13] will satisfy all people or be applicable to all conditions and satisfy all pocketbooks is as far from fact as is the idea that one type of religion will be applicable to all states of society and will satisfy all human beings. A recognition of this truth is one of the practical advances in administrative sanitation.

Fecal disposal.—In methods of ultimate disposal of the excreta it is not clear that we have made much progress recently. Fermentation still remains the most economical safeguarding method, and the increasing cost of labor still remains a serious obstacle, in many localities, to any attempt to turn excreta disposal into a commercially profitable industry. It is interesting to estimate the tens or hundreds of millions of dollars which the Nation loses annually in wasting human excreta; but to be logical and consistent we should estimate also the financial loss which results from burying or cremating the dead instead of rendering their bodies into commercial products. There are some money losses we have to stand in a philosophical spirit, for the sake of sentiment, respect, cleanliness, and public health. As for the farm, I know of no more generally applicable system of excreta disposal than topsoil burial or than fermentation and liquefaction with properly safeguarded subsoil drainage.

Viability of contagium.—The recent statistical studies on the death rate of the free contagium (eggs, embryos, and larvæ) have been

[12] Medical Director L. L. Lumsden, U. S. Public Health Service.

[13] The term "latrine" is ambiguous; it is an English transliteration of the Latin *latrina* (derived from *lavo*, I wash), which means a bath, a brothel, a water-closet, or a privy.

exceedingly interesting, expressing in mathematical terms (and therefore more proportionately) a principle of general common observation and knowledge of decades ago, namely, that there is a tremendous variation and ofttimes a tremendous rapidity in the death rate of the contagium; and in this connection my tendency is to place more emphasis on the point as to how long some of this contagium can live (up to 18 months or more) rather than how soon (a few hours to a few weeks) some or most of it will die. The area of land required for the disposal of the excreta of one family is so small that no appreciable economic loss results from letting the few square yards of land remain idle for at least a year or two, thus allowing for variables; to utilize this ground after a few months, on basis of a high, rapid infant mortality among hookworms is to overlook the point that some of the contagium can live more than a year (in water) and that typhoid is reported as viable in the soil for five and one-half months, possibly longer; *Ascaris* also should not be ignored in this question.

Antisanitationists.—It will be difficult for some of you to believe that only a few decades ago, when the proposition was made to install water-closets at a certain State university and bathtubs at another, serious objection was raised in the trustees' meetings against "spoiling" the students by these new fandangled contraptions. It will perhaps be equally difficult for some of you to believe that less than 25 years ago a certain college which had installed water-closets in the dormitories was obliged, because of the prejudice of the students, to supplement the closets by "squatters' privies" in order to protect its campus; it will be almost impossible for some of you to believe that less than three decades ago a county political campaign was waged and the election based on the point whether or not privies should be constructed at the public school at the county seat.[14]

To reach families or other units who still will not construct privies, the most practical suggestion I can make is to induce their religious advisers (preacher, priest, rabbi, or reader) to place sanitation on an Old Testament basis. There are not a few health factors which are written into religious creeds, as, for instance, with regard to food (fasting, vegetarianism, meatless days, unclean meats, methods of slaughter, etc.) which surely have less important health basis than has excreta disposal. In fact, it is a far-sighted plan for health officers to make friends with theological seminaries and law schools—with the embryonic clergy in order to pass on to the people the religion of health, and with the fetal solons in order to help future public health legislation.

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[14] For the benefit of the State health officer who "comes from Missouri," I will state that I was one of the "stump speechers" and "spellbinders" in this campaign and can vouch absolutely for the facts.

Treatment.—Under *treatment*, the mere mention of Maurice Hall's brilliant and valuable work on carbon tetrachloride summarizes the most important advance in the therapeusis of hookworm disease.

Technique of campaign.—The campaign technique recommended to the health officer by some persons seems to have undergone some changes within recent years. For a man who is familiar with the clinical side of his problem, I do not see the necessity for certain of the details emphasized to-day. Any experienced "old timer" can safely agree to visit the public schools and the cotton mills of a county, spend, say, a few minutes in each room, critically scan the students and mill hands, call for the "repeaters" in the school, confirm his tentative diagnosis microscopically in a restricted number of cases, and at minimum expenditure of time reach as trustworthy an estimate as to whether an antihookworm campaign on the part of the county health officer is worth while as will the man who, adopting quasi-mathematical oology, plots the rainfall [15] and the temperature,[16] maps the different types of soil [17] in the country with embryo-larva counts, and makes egg counts on a cross section of the general population, and later of the white school children. Another man may prefer the latter method; and if he is not familiar with the clinical side of the subject, I would advise him by all means to follow the oological method.

I am speaking from the standpoint of the South. Not being familiar with the disease in China, Japan, India, and the South Sea Islands, I do not know what details I would follow if I received instructions to work in those areas. I would make a decision only after I had studied the local problem, and if an Asiatic physician were to come here to carry on an antihookworm campaign I would expect him to do likewise.

In other words, there is no one "best" technique. The problem is full of local variables, the training and psychology of the campaigner and of the campaigned, the funds available, the density of population, the value of human life in a particular locality, and many other factors. When the outstanding variable factors in the problem are known, particularly the clinical manifestations of the infection among the inhabitants (men, women, and children, white, Indian, or black) of the county, one plan or another, individual treatment or restricted and safeguarded mass treatment, sanitation or unsanitation, egg counts or clinical observation, diplomacy or the recorders' court, can be decided upon without difficulty; and in general, the more simple the plan, the better the probable results.

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[15] Local rainfall is not the only factor in moisture; a high ground water along a water course can, theoretically, result in a band of hookworm infection traversing an area with a very low rainfall in any given year or in a series of years. The rainfall is a "variable," even in an area of a few square miles.

[16] Minimum surface temperature is not dependable in judging hookworm disease in mines.

[17] Many families move from sand areas to clay areas, for instance, into cotton-mill villages.

Mathematics and variables.—It is interesting to note that various different secondary techniques which were used from 1880 to 1912 seem to have been modified into specially developed primary methods[18] known under special names.

In this special development the tendency has been clearly in the direction of reducing everything to a quasi-mathematical oological formula. I am a firm believer in mathematics. For instance, if I drive at the average rate of 25 miles per hour it will take me 4 hours to cover the distance between two towns 100 miles apart by the State highway—that is, *if* there is no variable, such as punctures, blow-outs, lack of gas, oil, or of water, collision, broken springs, detours, friendly debates with State police, etc. But I recognize my automobile as subject to variables. In the quasi-mathematical, oological basis to which hookworm disease seems to have been reduced, I concur only to some extent with the newer generation of authors on the value of mathematics, namely, to the extent mathematics is usually of value; but I find it difficult to supplant the stethoscope entirely by the lumber counter, the adding machine, and the slide rule; and somehow it is very difficult for me to break the habit, contracted in student days, of giving at least some consideration to the great variable in this disease, namely, the human being who harbors the worm.

Egg counts.—Hookworm egg counts were used by Lutz (1885) and Leichtenstern (1886) about 45 years ago. They were used more or less (in at least three laboratories I know of) as a general indication or signpost which pointed out the road but did not give the exact distance in miles; for instance, case *A* showed only 3 eggs per cover glass and case *B* showed 20 eggs per cover glass, therefore *B* probably had a heavier infection than *A*—*provided* the worms were in the same stage of development, *provided* there were an equal number of female worms of egg-producing age in the two cases, *provided A* and *B* were approximately of the same age and had been having the same diet and had equally good digestion, *provided A* had not had some food or drug which caused a temporary suspension of oviposition, etc. To my friend and colleague Norman Stoll we owe the modification and higher development of this early technique, and I agree with him in the value of his mathematics—*if* we still admit the possibilities of variables and *if* we view the result as a more or less approximate estimate and a far better estimate than the technique permitted prior to Stoll's splendid work. But I can not pythagorize with others of my mathematically inclined helminthological colleagues who apply the egg-count method to a quasi-mathematically exact con-

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[18] A short time ago I actually saw a statement that the centrifuge had been introduced recently [!] as an aid to diagnosis; but this "recent" discovery has not yet been tied up to any person's name, such as "John Doe's centrifuge method."

clusion[19] that a person who one day had 599 (or 600) eggs per gram feces (reduced by estimate from a stool interpreted as diarrheic or mushy to one interpreted as solid) harbors x (or $x+1$) worms, and on basis of this oological result decides whether that person is well or ill and whether it is worth while to institute or to discourage or to eliminate treatment. Personally, I can reach a conclusion, more satisfactory to myself at least, on basis of clinical study.

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[19] It is to be recalled that in estimating the number of eggs per gram feces which represent one egg-laying female or her supposedly monogamous mate, the stools are to be classified into "formed," "mushy," and "liquid." Quite aside from the fact that there is no sharp line of demarcation between these three categories, the oologist is called upon to use his subjective judgment in border line cases and to draw two definite boundary lines between three nonseparable conditions; this is inherent in the premises of his mathematical formula, even if he alternates doubtful cases.

Since the discipline of mathematics (τό μάθημα, that which is learned; μάθηματικός, fond of learning) is classified as an "exact science," it follows theoretically either that the subject of mathematics must be reclassified or that the result obtained is not mathematically exact but only an estimate.

Recent literature contains the following egg counts per gram feces as representing one worm in the intestine:

10, 12 (liquid), 18.3 (formed), 25 (mushy), 25, 30, 33, 44, 44 (formed), 47, 48, 53, 166, 177, extremes 10 and 177.

Reduced to a specific example this means that if 600 eggs per gram feces are accepted as representing 25 worms (12½ males, 12½ females), in face of the variants 10 to 177, the rule adopted is that "all persons with light infestations [1 to 25 or 1 to 100] *should be advised that they are carriers but do not need treatment;*" "treatment *should be limited to those individuals actually suffering with hookworm disease*" (as per estimate by oological formula). (Italics not in the original.)

Stoll (1924, Amer. J. Hyg., p. 498) states:

"Judged by coefficients of variation, the average of three consecutive days' output of eggs is about three times more reliable than [the output] of a random day, and of two consecutive days twice as reliable as a single day. Groups of four or more consecutive days' output give increased accuracy beyond that secured by averaging three consecutive days, but at a less rate."

(Thus, the egg count one day may classify a person as a patient, but an egg count the next day may classify him as a carrier.)

Chandler (1929, p. 335) remarks:

"It is obvious from these various estimates that the correlation between eggs per gram and worms harbored is far from being uniform, yet for rough calculation of average intensities of infestation the egg count seems to be satisfactory and is widely accepted."

Smillie and Augustine (1926, p. 154) say:

"Unless a series of samples are taken on a single person, the method is not a satisfactory index of the exact number of worms harbored by an individual, but it is of no great importance whether or not we know the exact number of worms harbored by an individual."

It would thus appear from some of the recent oological literature that—

a, the formula for estimating the number of worms, on basis of egg count, is admittedly subjective, is subject to variables, is not mathematically exact, and may give different classifications of one and the same person from day to day;

b, the conclusion as to the number of worms drawn by application of the successive formulæ is admittedly a "rough" estimate, not mathematically exact;

c, but it is really unimportant to know the "exact number" (x, or $x+1$) of worms a person has;

d, ergo, any division of infected persons into carriers and patients on basis of that formula is rough, untrustworthy, and really not important.

An alternate to *d* is—

d', it is inconsequential whether a person is classified as a carrier or a patient; ergo, treatment is not necessary.

Still another alternate to *d* is—

d'', since x worms represent the quasi-mathematical basis for "healthy carriers," hookworms are excluded as explanation of any symptom which any of these carriers may have; and

e, since $x+1$ worms represents the quasi-mathematical basis for "patients," any person whose "worm burden" is $x+1$ actually suffers from hookworm disease, even if he exhibits no measurable or unmeasurable symptom.

I opine that it will take some time before bedside clinicians generally adopt oological classification based upon the laboratory use of the lumber counter, the adding machine, and the slide rule, logically calling for a substitution of quasi-mathematical data alone in place of a combination of anatomy and physiology in judging between health and disease, and ignoring the individual extremes in favor of the mean average of the group in which the introduction of a few exceptional cases may upset the mean.

For about 45 years past the egg count has had its uses; Stoll has increased tremendously its value for research work; but when carried too far, as in the Pythagoristic plan of campaign, its application (as seen through my spectacles) decreases in value, changes from a use to an abuse, and becomes an administrative extravagance.[20] I have a feeling that the pendulum is swinging from the lumber counter back toward the stethoscope.

Worm counts.—Leichtenstern used worm counts with comparison of the sexes as basis for estimating the completeness of cure, and worm counts have been in use, more or less, for nearly half a century, for one purpose or another. They have their use, but their abuse develops when we fail to consider that it takes a combination of two species of animals to produce hookworm disease, namely, the parasite and the patient.

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[20] The following quotations from recent articles on hookworm oology are interesting in this connection:

"There is as yet no accepted correlation of ova counts with the number of worms present in a host."—Caldwell and Caldwell, 1926, Amer. J. Hyg., v. 6, 158.

"The exact significance of an ova count from one specimen is uncertain."—Caldwell and Caldwell, 1926, Amer. J. Hyg., v. 6, 158.

"In field surveys and in public health laboratory routine, it is not practicable to examine several stools from the same individual; and as the exact significance of an ova count from one specimen of feces is uncertain (Stoll, 1923), it seems to us that to spend much time in making a precise ova count is neither justifiable nor logical. Yet an idea of the relative intensity of infestation is important both to the field worker and to the physician."—Caldwell and Caldwell, 1926, Amer. J. Hyg., v. 6, 158.

"Generally, the higher the percentage of persons infected in a given locality, the larger is the average number of worms harbored by infected individuals, the more severe are the symptoms found, and the more difficult is the disease to bring under control."—Rept. for 1918, International Health Board, p. 114. (Conceivably, exceptions to this condition might exist.)

"While it is true that there is a very considerable day-to-day variation in the eggs per gram in individuals, and a variation in different individuals according to the nature of the food and the consequent size and consistency of the stools, as well as variations due to errors in sampling and technique, all of which make the egg counts unreliable in individual cases, these variations tend to a large extent to be blotted out when the data from 50 to 100 people are considered. There are racial characteristics with respect to the size of the stools, resulting from differences in food habits, which result in actual average differences in the number of eggs per gram which can be accepted as representing the output of a single hookworm, and therefore in the intensity of infection indicated by a given egg count.

"It is obvious that a given number of eggs per gram in a child would represent a smaller number of ovipositing hookworms than a similar number in an adult, since the stools are smaller; but since there is good evidence that a given degree of infection is more harmful in children than in adults, a statement of the number of eggs per gram gives a fairer indication of the severity of the infection than would a statement of the number of worms harbored."—Chandler, 1929, Amer. J. Hyg., v. 9, pp. 485, 487.

"The interpretation of egg counts into worm counts, taking into consideration the factors involved, is of interest, but is unnecessary, and in my opinion undesirable, for purposes of comparison."—Chandler, 1929, Amer. J. Hyg., v. 9, 487.

Chandler (1929, Amer. J. Hyg., v. 9, p. 482) emphasizes the well-known principle that an individual case may upset the egg-count conclusions of a group.

"It has been seen that general health, size of stools, seasonal or continuous acquisition of infection, intensity of individual infection, and the species of worm concerned may all greatly influence the hookworms' egg output and ought all to be taken into account in attempting a true estimate of the worm load of a community, and that the question of consistency of stool on which so much stress is being laid is an uncertain and inadequately measured factor which has been quite unduly emphasized. It follows that egg counts have not hitherto measured dependably the worm load of a community and can be made to do so only with great difficulty. For certain investigations accurate egg counts are essential; they have indeed been in the past, and will be in the future, of the greatest value; but, as usually undertaken with the idea of obtaining the real measure of the worm load of a community, particularly the load before and after mass treatment, it must be concluded in our present state of knowledge that they are, in spite of their reassuring appearance of accuracy, a waste of time and money."—Lane, 1930, Lancet, London (5566), vol. 218, vol. 1 (18), May 3, pp. 978–981.

Mass treatment.—Mass, herd, or flock treatment for worms is an old technique. It is the common method, used for decades past, for so-called wireworm disease and for scab in flocks of sheep and goats, and for tick eradication in herds of cattle. It has been used in the swine and in the poultry industries for certainly more than half a century. But the owner of a stable of fine-bred racing horses would hesitate to use it indiscriminately on his valuable stock. The principle is that live "horseflesh" is more valuable than live "hog meat."

There is nothing new in principle in mass treatment for hookworm disease. Taken over from veterinary practice, it was used (under restrictions and precautions) in South Carolina in some instances as early as 1902. When the American soldiers were being trained for service during the World War it was decided that these men were too valuable to the country to justify mass treatment, and objection was properly raised to its indiscriminate use in an entire regiment.

The comparison with livestock, the home of mass treatment, fairly represents my idea on the subject of mass treatment, namely, in a locality where human life is more or less valuable, as in civilized countries, it is only in restricted instances and under very special precautions that I personally would be willing to assume responsibility for mass treatment; but in semicivilized or uncivilized regions, where human life is cheap, where men, women, and children are little above livestock, and where it is a choice of a much greater good by means of mass treatment or a much lesser good by individual treatment, I would be governed by a conservative interpretation of the conditions as I saw them. In our country, where a free microscopic examination is obtainable for the asking, I know of no health officer whose moments are, even subjectively, so valuable that he can not take time to ask for microscopic examination, especially in doubtful clinical cases, before he administers a drug which may cause severe reactions or even death in especially susceptible persons or in certain recognizable complications. For instance, carbon tetrachloride may cause *Ascaris lumbricoides* to wander and thereby to cause a fatality; ascaris infection may simulate hookworm disease, appendicitis, or pneumonia; to administer carbon tetrachloride even in pure hookworm infection to an alcoholic patient, may result in the death of the patient; ergo, a cautious clinician will avoid unnecessary promiscuous mass treatment.

Various other new or supposedly new specializations of the older methods might be discussed, one after another, with the same general conclusion, namely, that there is no one special "best" method which is applicable to al communities by all health officers, but the county

health officer must select the method best adapted to the combined circumstances under which he is working, best suited to the combination of the community and himself.

Changed relative status of hookworm disease.—Note, please, the use of the term "county health officer" instead of "State hookworm field agent." By this use of words I wish to signify that the hookworm situation in this country has passed out of the stage it occupied in 1902 to 1912 (namely, a stage in which it was new to most of our health officers, our clinicians, and our inhabitants) into the stage where it occupies a place alongside of its colleagues, malaria, tuberculosis, diphtheria, pellagra, etc., i. e., part of the routine of southern clinicians and southern health officers, part of the sine qua non of their basic professional education. True, health officers and general clinicians will continue occasionally to have reason to call into consultation men especially familiar with hookworm disease; but our health officers to-day are backed by a vastly greater widespread, professional and lay, general information on the disease than they were 25 years ago, and therefore the administrative problem has changed to a corresponding degree.

SUMMARY

It is theoretically and practically impossible to lay down a detailed plan of work for all health officers to-day. In general terms I would summarize the subject as follows:

(1) The health officer's chief vantage ground for gaining and distributing information still lies in the schools (including all types), the churches, and in the industries (including the mills, factories, and mines).

(2) His chief ally for microscopic diagnosis is the laboratory of the State board of health; it is diagnosis he wants (not egg counts and counts on soil infection), and the report on the diagnosis should include report on *Ascaris* in case he plans to use carbon tetrachloride.

(3) His chief ally for treatment is the family physician—a greater ally than ever before and one whose field of treatment should be invaded as little as feasible.

(4) In addition to the rural school teacher, whose wonderful support we enjoyed from the beginning of the work, the health officer's chief allies for applying methods of prevention are a sensible sanitary inspector and a sensible county nurse who can talk the same vernacular as the people, who can think their thoughts, and who can appreciate the great potentiality of the mother in the home.

(5) It is unnecessary to argue the point before this audience that any plan savoring of routine mass treatment in the public schools, either in getting rid of hookworms or of tonsils, without full consent and cooperation of the parents and the local physicians, will sooner

or later lead to serious antagonism between the health officers on the one hand and the parents, physicians, and courts on the other.

(6) I can not advise the general adoption of the new quasi-mathematical Pythagoristic oological plan, which, from my viewpoint, not only is based on incomplete premises and error in logic, but includes unessentials in administration, and sails too close to the wind in respect to professional ethics and legal responsibility.

(7) From the standpoint of administrative technique, the great function of the county health officer is to line up all of his allies to play their rôles to the limit. The difference between the percentage of rôle these allies play and 100 per cent of what they might play represents the work which the county health officer himself should perform in addition to his function of seeing that he does no work which he can induce his allies to do.

THE PROPOSED MORBIDITY REPORTING AREA[1]

By R. C. Williams, *Assistant Surgeon General, United States Public Health Service*

Last year there was presented to this conference a plan for a proposed morbidity reporting area. Since that time personal visits have been made to a number of the State health departments, and the plan has been thoughtfully discussed with many experienced health officers. The reception accorded the plan has varied from polite attention to enthusiastic cooperation. The results of the experience of a year with the suggested plan are presented for consideration.

As has been pointed out, the purpose of such an area is to stimulate and standardize the reporting of notifiable diseases in the United States. At the present time the average State health department requires the reporting of approximately 40 diseases in accordance with State law or regulations. These diseases range from anthrax to yellow fever. From a practical standpoint, the actual reporting of notifiable diseases in a given health jurisdiction usually narrows down to diseases which are important from a public health standpoint and are of more frequent occurrence. Every State in the Union at present has sufficient authority by law and regulations to require and obtain the reporting of all notifiable diseases that occur within its boundaries.

It must be conceded, however, that the reporting of notifiable diseases in many sections of the country is far from complete or satisfactory. It would appear, therefore, in spite of the fact that

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[1] Presented at the Twenty-eighth Annual Conference of State and Territorial Health Officers with the United States Public Health Service, Washington, D. C., June 18, 1930 (held jointly with the Forty-fifth Annual Conference of State and Provincial Health Authorities of North America).

there is at present sufficient legal authority regarding obligatory reporting, that some additional means must be evolved whereby public health authorities may obtain better reporting from physicians and other responsible persons. With this end in view, the plan for a proposed morbidity reporting area was presented for consideration last year. It is not contended that the plan is by any means perfect or complete. It is realized that it is more or less experimental; and with that thought in mind it was submitted for study and revision.

It is apparent that it would be impracticable to require the reporting of forty-odd diseases for admission into the proposed morbidity reporting area. It is also obvious that diseases which occur only in certain sections of the country should not be required for this purpose, such, for example, as malaria, hookworm disease, pellagra, or certain industrial diseases, such as lead poisoning. It will be recalled that six diseases of considerable public health importance were tentatively selected, and upon the reporting of these diseases admission into the morbidity reporting area was to be based. These diseases are diphtheria, infantile paralysis, smallpox, scarlet fever, typhoid fever, and tuberculosis.

In order to provide a point of departure in studying the matter, a tentative requirement of 75 per cent of the clinically recognized cases was fixed. The problem then was to determine what percentage of cases which actually occur in a given community are reported to the health authorities. This phase of the subject is exceedingly complicated. Some authorities contend that these standards should be based upon fatality rates; that is, a given number of cases to be reported for each death. Unfortunately, the fatality rates from practically all the diseases vary greatly from year to year. Often there is a marked variation in the same disease in the same year in the same State. Virulence of epidemics varies, and most diseases seem to vary in fatality rates in different sections of the country.

The plan presented last year provided for a canvass or survey of a certain percentage of the population in an endeavor to obtain a sample as the basis for an estimation of the number of cases actually occurring, which could be compared with the number officially reported to the health authorities for a given period of time. In this way an attempt would be made to obtain an index of the percentage of cases occurring that are actually reported for that period. It was suggested that a sample of 1 per cent of the population would give a basis for this estimation.

A house-to-house canvass of 1 per cent of the population (estimating four persons to a family) is no small undertaking, particularly in large cities and in rural communities. It is realized that 1 per cent of the population is a small sample, but an increase in the size of the sample to 2 per cent, 5 per cent, or 10 per cent would enormously

increase the cost and make the plan practically prohibitive. The objection that with a 1 per cent sample a relatively small number of cases may be found is, of course, true. It has been suggested that a circular mailing postal card be sent to 5 per cent or 10 per cent of the population with the request that information be supplied with reference to the six diseases mentioned and returned to the health officers. The number of replies that would be received from this plan is problematical. Previous experience with such a method, although limited, is not encouraging.

Following an invitation issued by the Public Health Service, a number of States, cities, and counties have made application for admission into the proposed morbidity reporting area. The survey of 1 per cent of the population, with reference to the ocurrence during the calendar year 1929 of the six diseases mentioned for comparison with cases officially reported, was requested of those States, cities, or counties that made application. Several of the cities and counties have completed the required survey. At least two States are known also to have completed such a survey on a state-wide basis; and it is of interest to note the experiences in connection with such surveys. One State health officer expresses the opinion that, no matter whether or not his State qualifies for the proposed morbidity reporting area, the survey has done the State health department an immense amount of good by giving not only a better view of the work of the local health machinery but a definite stimulus to local boards of health to carry out their routine reports to his office. Another State health officer completed the survey and forwarded a most interesting summary. This report covers a total population of almost 7,000,000 persons. The households visited numbered 27,583, representing 119,814 persons. A tabulation of the results indicates that of the cases found on the survey there had been reported 64.6 per cent of the diphtheria cases; 30 per cent of the infantile paralysis cases; 62.1 per cent of the scarlet fever cases; 62.6 per cent of the smallpox cases; 61.5 per cent of the typhoid fever cases; and 52 per cent of the tuberculosis cases. It is believed that this summary of the survey in this State, which has an excellent State health department, furnishes the first definite information on a state-wide basis on this important subject which it has yet been possible to obtain. The figures represent perhaps better than the average that is obtained by many State health departments. The fact that apparently less than 75 per cent of all these diseases are being reported would appear to be sufficient reason for health authorities to interest themselves in the fundamental problem of obtaining adequate reporting of the various important communicable diseases.

Another State having an excellent State health department undertook to make this survey on a state-wide basis, but after a time dis-

continued the survey as it was felt that the procedure and plan were unsound, the reasons given being as follows: (1) A 1 per cent sample gives too few cases of the diseases in question. It was suggested that if a different group of diseases had been adopted, such as measles and chicken pox, there would have been more cases recorded; but cases of typhoid fever, smallpox, and infantile paralysis are rare, and the number found was very small. In the survey only one unreported case of infantile paralysis was located. On the law of chance, if the survey had been continued throughout the State, it was thought that not more than three cases of infantile paralysis would have been located. It was felt that one unreported case out of three involved too small a number upon which to base a satisfactory record. (2) The cost of the survey averaged about 12 cents per record, and it was believed that it would be impossible to make a survey sufficiently large to be statistically sound. If funds had been available which could have been expended on such a survey, it was felt that possibly figures could have been obtained that would have been of value.

Experience indicated that some individuals will not give correct answers to questions in the time allowed for questioning. In one instance the canvasser was told that there had been no case of communicable disease in the family during the past year. In going over the records of the city in which the family lived it was observed that three cases of scarlet fever had been reported from that family. It seemed necessary in making this survey to go into a house and spend some time talking upon various subjects in order to put the informant in a frame of mind to answer correctly the questions propounded. It was found in city X, where questions were asked regarding the incidence of tuberculosis in connection with many other questions, that there was obtained a much larger number of cases than in city Y, where the questions were limited. The same canvassers worked in city X and city Y, and the ratio of cases of tuberculosis to deaths in city X was about five times as great as city Y. It was found that in the case of tuberculosis about 94 per cent of the cases were reported. This is believed higher than was actually the case. From the standpoint of accuracy and cost, this method was thought to be of little value.

In submitting the proposal to establish a morbidity reporting area for consideration and discussion, the surveys or canvasses suggested were to be in the nature of an investigation as to whether or not it is practicable to establish such an area. The impracticability of establishing the area might be the result of—

(*a*) Reporting being so incomplete in the greater part of the country that it might not be worth while to establish an area; or

(*b*) The cost of checking the completeness of reporting being prohibitive or at least so expensive that the value of the area would probably not be worth the expense necessary to make the check.

It would appear that the recognition and handling of extremely mild cases constitute a problem in themselves and can hardly be considered along with the reporting of cases that are recognized. It should also be borne in mind that while it is possible to obtain a very high percentage of registration of births and deaths, yet by reason of the very nature of things, particularly with reference to mild unrecognized cases, differences as to diagnosis, and other reasons, it will never be possible to obtain as complete reporting of communicable diseases as would be expected in the recording of births and deaths.

The following suggestions have been submitted as criteria in determining the admissibility to the proposed morbidity reporting area of States having 500,000 or more population:

1. The State shall be in the registration areas for births and deaths.

2. The State shall have a morbidity reporting law or regulations requiring—

a. An immediate report to the local health officer of each case of diphtheria, infantile paralysis, measles, smallpox, scarlet fever, typhoid fever, tuberculosis, whooping cough, giving name, age, sex, and address;

b. (1) A daily report by the local health officer to the State health department of each case reported to him, giving the above details of name, age, sex, and address;

(2) A report at least once weekly of the total cases of each disease reported during the preceding week, and a monthly summary of each disease by age and sex.

(3) A check made each month on the deaths from the above-mentioned diseases to ascertain whether or not they have previously been reported as cases. The check shall be done by the State health department except for communities submitting weekly or monthly summaries; the latter are to report the total deaths from each cause and the number found to have been reported as cases prior to death.

(4) The State shall attain a suitable fatality rate for diphtheria, measles, scarlet fever, typhoid fever, and whooping cough.

In considering these suggestions, it is well to remember that only two States are now outside the birth and death registration area, so that the question as to whether or not a particular community is in the birth or death registration area is no longer a current problem. It will also be noted that every State in the Union now has sufficient law or regulation to obtain adequate reporting of communicable diseases.

The amount of information regarding the cases of communicable diseases that a State health department should demand of the local health units is a controversial one. It has been the policy in attempting to develop a plan for a morbidity reporting area to interfere as little as possible with existing law or regulation. The endeavor has been to stimulate and make more effective the existing methods. The question which presents itself for consideration is whether an effort should be made to continue to develop a morbidity reporting area along the line originally planned and submitted at the last conference, whether the plan should be abandoned entirely, or whether modifications somewhat along the line above suggested should be adopted. It is hoped that full discussion will be had in order that some definite decision may be reached with regard to this matter.

If nothing more has been accomplished than the securing of some state-wide information regarding the percentage reporting, and again reiterating and emphasizing the necessity and importance of adequate reporting of the communicable diseases, it will be felt that at least some useful purpose has been served in attempting to develop a morbidity reporting area.

COMPARATIVE CURRENT STATE MORTALITY STATISTICS [1]

In this, as in the preceding report on current mortality statistics, the plan of publication has been changed from a monthly basis to the presentation of rates for a period including as many months of the current calendar year as are available, with comparative rates for the same period in the three preceding calendar years where data are available for those years. In the present report, figures are given for the 5-month period from January to May of 1930 for a number of the States, but for others the period is shorter. In the instance of many of the causes of death included in this report there is little seasonal variation and monthly rates seem unnecessary. It is believed that these rates for the "year-to-date" for each State with comparative rates for corresponding periods in preceding years will be more useful than monthly rates.

The rates are computed from current and generally preliminary reports furnished by State departments of health. Because of (*a*) some lack of uniformity in the method of classifying deaths according to cause, (*b*) some delayed death certificates, and (*c*) various other reasons, these preliminary rates can not be expected to agree in all instances with final rates published by the Bureau of the Census, which are based on a complete review and retabulation of the individual death certificates from each State. The preliminary rates given in the accompanying table are intended to serve as a current

[1] From the Office of Statistical Investigations, United States Public Health Service.

index of mortality until final figures are issued by the Bureau of the Census.

Populations used in computing the rates are estimates as of July 1, 1929, based on the 1910 and 1920 censuses. Provisional results of the census of 1930 have been announced for only part of the States, and so it seemed best to base this report on the old estimates. In the next report it is hoped to use new population estimates and to revise not only the 1930 rates on that basis but the comparative rates for preceding years also.

Death rates from certain causes in stated periods of 1930, with comparative data for corresponding periods in preceding years

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births: Infant mortality	Rate per 1,000 live births: All except malformations and early infancy	Rate per 1,000 live births: Maternal mortality (143–150)	Rates per 100,000 population (annual basis): Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31–37)	Cancer, all forms (43–49)	Diabetes (57)	Diseases of the nervous system (70–86)	Cerebral hemorrhage and apoplexy (74)	Diseases of the circulatory system (87–96)	Diseases of the heart (87–90)	Diseases of the respiratory system (97–107)	Pneumonia, all forms (100, 101)	Diseases of the digestive system (108–127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
7 States *	January to May	1930	11.9	(1)	(1)	(1)	1.6	8.1	2.7	6.2	6.9	34.2	0.5	1.3	7.5	80.1	82.7	19.3	111.4	87.9	234.1	206.5	132.3	117.1	70.4	8.5	88.5
		1929	13.3	(1)	(1)	(1)	1.8	2.7	2.7	7.4	7.4	133.9	.6	1.3	7.9	85.6	83.1	18.2	129.0	88.4	245.1	221.0	148.7	132.6	72.0	9.0	87.7
Alabama	do	1930	11.9	(1)	(1)	(1)	2.8	4.7	.8	10.3	4.4	58.3	.7	.8	1.9	89.3	49.7	9.6	97.9	60.6	152.4	140.1	139.4	125.9	62.5	12.4	103.5
		1929	13.7	88	57	8.7	3.3	4.1	1.0	9.5	4.8	253.3	.8	1.5	1.4	85.5	44.5	9.4	100.8	59.1	142.7	133.5	144.1	136.5	85.9	14.1	91.7
		1928	12.5	85	51	8.6	4.2	14.6	.4	7.3	5.6	92.2	.7	(1)	(1)	91.7	44.1	10.3	(1)	60.1	(1)	128.1	(1)	154.8	(1)	11.0	82.4
		1927	10.1	64	36	7.3	5.2	5.1	.9	13.9	4.0	38.7	.7	(1)	(1)	88.1	45.4	6.7	(1)	47.2	(1)	99.5	(1)	82.0	(1)	19.0	72.4
Arizona	January to April	1930	14.5	(1)	(1)	(1)	4.4	1.2	1.9	6.2	6.8	24.3	(2)	.6	29.9	329.0	49.8	6.2	118.2	59.7	144.9	125.0	250.1	202.2	112.6	51.6	53.5
		1929	14.2	134	104	6.2	8.7	(2)	5.0	9.3	3.1	28.0	.6	1.2	17.4	341.5	51.0	2.5	88.3	39.2	130.0	118.2	171.7	134.4	143.1	82.1	44.8
California	do	1930	14.8	58	28	6.1	1.6	9.0	2.6	3.5	5.3	16.3	.8	1.5	5.9	134.3	144.8	26.2	147.9	106.9	368.2	317.1	131.7	113.2	90.7	14.1	104.3
		1929	15.4	70	37	5.6	1.8	.5	2.6	6.6	3.4	49.5	.7	1.9	12.0	139.5	135.9	25.5	145.7	101.7	376.1	330.5	146.6	129.3	87.1	9.4	117.2
		1928	14.9	64	34	6.0	1.5	.9	1.3	4.9	7.6	21.8	2.2	1.3	2.7	141.0	138.3	23.6	141.0	99.5	339.1	291.9	132.8	117.5	83.3	11.2	120.1
Connecticut	do	1930	11.9	77	(1)	(1)	.7	.2	3.4	3.0	4.1	27.4	.7	1.1	1.1	62.9	112.0	21.7	(1)	(1)	(1)	208.5	(1)	146.9	(1)	8.1	81.9
		1929	12.8	81	(1)	6.1	.2	5.6	1.4	3.4	3.4	94.6	(2)	1.4	1.6	66.5	105.5	18.1	(1)	(1)	(1)	213.3	(1)	176.9	(1)	7.5	76.1
		1928	11.6	73	(1)	7.9	1.1	3.8	1.5	6.4	7.1	24.9	.5	1.8	.7	72.2	103.2	(1)	(1)	(1)	(1)	183.6	(1)	145.9	(1)	5.8	(1)
		1927	11.4	71	(1)	6.7	.9	2.6	2.0	3.9	5.2	32.9	.4	(1)	.6	74.0	102.1	(1)	(1)	(1)	(1)	190.4	(1)	120.8	(1)	8.4	(1)
District of Columbia	January to May	1930	14.2	69	34	11.1	.9	(2)	3.1	3.5	3.9	7.4	(2)	.4	1.8	112.1	118.7	28.0	133.6	97.7	357.3	308.3	166.0	141.9	79.3	5.7	156.3
		1929	15.6	71	37	7.1	.9	(2)	3.1	5.3	7.0	39.4	(2)	(2)	2.2	126.1	119.1	28.9	134.9	85.4	374.8	320.1	217.6	192.2	83.6	4.4	167.3
		1928	14.2	(1)	(1)	(1)	1.7	4.8	1.7	3.1	7.4	21.8	.9	.9	.9	113.9	117.3	29.2	137.0	97.7	318.4	281.4	192.4	165.3	81.1	9.2	155.3
		1927	14.7	(1)	(1)	(1)	.9	(2)	.9	3.6	7.2	35.8	(2)	1.8	.9	123.5	114.6	17.0	156.7	106.1	322.3	286.9	177.7	153.5	79.2	4.0	175.9
Florida	January to March	1930	14.0	67	35	10.8	5.0	4.2	(2)	2.2	3.9	43.6	.6	.8	.6	74.2	83.1	17.0	153.4	129.3	241.3	218.2	116.2	92.0	98.4	19.2	134.8
Georgia	January to April	1930	10.7	84	(1)	10.2	3.3	6.3	1.0	6.8	3.3	56.8	1.3	.4	4.6	68.2	42.9	11.5	114.9	77.9	137.9	125.7	131.0	119.0	52.6	5.5	128.4
		1929	11.2	(1)	(1)	(1)	3.0	2.1	1.1	4.5	3.4	196.0	(1)	(1)	(1)	66.0	38.3	9.5	(1)	65.3	(1)	102.7	(1)	107.2	(1)	7.1	121.6

Hawaii	January to February.	1930	11.8	104	(1)	(1)	1.7	5.2	(2)	12.1	22.5	19.0	(2)	(1)	5.2	96.8	55.3	15.6	(1)	51.8	(1)	141.7	(1)	143.4	181.4	117.5	(1)
		1929	14.2	109	(1)	(1)	1.8	3.5	(2)	33.7	7.1	26.6	(2)	(2)	14.2	99.3	70.9	8.9	(1)	65.6	(1)	127.6	(1)	196.8	205.6	125.9	(1)
		1928	12.6	(1)	(1)	(1)	5.2	3.5	(2)	3.5	12.2	15.7	(1)	(1)	5.2	132.8	76.9	5.2	(1)	45.4	(1)	127.6	(1)	188.8	183.5	101.4	(1)
Idaho	January to May	1930	7.5	53	26	4.2	1.3	1.7	1.7	1.7	1.7	6.7	(1)	(1)	6.5	27.3	46.4	6.1	85.8	54.6	155.9	138.6	107.0	90.5	40.3	.9	31.2
Illinois	January to April	1930	(1)	(1)	(1)	(1)	.7	1.7	6.5	2.2	9.5	21.3	.2	.5	4.1	65.9	(1)	(1)	(1)	(1)	(1)	(1)	(1)	101.0	(1)	(1)	(1)
		1929	(1)	(1)	(1)	(1)	1.1	5.7	5.4	2.8	9.3	87.5	.1	1.2	5.2	84.4	(1)	(1)	(1)	(1)	(1)	(1)	(1)	133.2	(1)	(1)	(1)
		1928	(1)	(1)	(1)	(1)	1.1	1.5	2.9	4.6	8.2	(1)	(1)	(1)	3.6	79.3	(1)	(1)	(1)	(1)	(1)	(1)	(1)	143.4	(1)	(1)	(1)
		1927	(1)	(1)	(1)	(1)	1.1	9.2	3.9	4.3	8.2	(1)	(1)	(1)	1.6	85.4	(1)	(1)	(1)	(1)	(1)	(1)	(1)	110.8	(1)	(1)	(1)
Indiana	January to May	1930	(1)	58	26	6.4	1.1	2.6	2.9	4.1	4.0	27.7	.3	.8	14.3	74.1	102.7	17.9	(1)	118.0	(1)	199.0	(1)	114.9	(1)	6.4	90.4
		1929	13.8	75	(1)	7.6	1.4	7.7	4.9	6.6	4.7	118.6	.2	.5	1.4	77.6	99.7	15.8	(1)	118.2	(1)	218.7	(1)	148.2	(1)	7.9	90.3
		1928	12.8	68	(1)	6.0	1.9	3.0	3.3	5.0	5.5	68.4	(1)	(1)	(1)	76.6	100.5	(1)	(1)	121.8	(1)	184.7	(1)	140.9	(1)	8.2	83.3
		1927	12.0	64	(1)	7.2	2.8	3.4	3.5	7.3	6.3	40.4	(1)	(1)	(1)	77.4	99.5	(1)	(1)	101.8	(1)	173.4	(1)	104.7	(1)	7.4	82.1
Iowa	do	1930	11.5	62	26	7.4	1.3	16.3	4.2	4.7	2.5	40.1	.1	2.5	4.4	37.3	110.0	24.8	147.9	101.0	273.2	216.7	123.0	112.4	71.0	3.3	45.8
		1929	11.8	62	26	6.7	1.2	1.6	3.0	5.6	.8	106.1	.8	1.8	2.5	37.3	109.6	20.6	146.1	105.1	284.3	251.6	106.2	88.0	62.6	3.5	57.8
		1928	10.9	61	25	6.6	1.9	(1)	2.5	3.2	2.9	60.9	.6	1.6	1.1	37.2	107.6	20.9	142.8	105.2	259.4	232.9	106.4	94.8	61.6	3.5	55.3
Kansas	January to March.	1930	11.6	60	30	9.2	1.1	3.3	4.0	4.6	5.3	61.6	.4	(2)	4.4	41.8	92.7	24.9	141.6	107.4	230.7	203.2	108.3	95.3	65.2	5.5	105.9
		1929	12.6	80	49	7.1	1.5	1.5	5.7	6.4	3.3	142.7	.4	.4	4.2	54.6	93.8	24.9	161.6	130.3	214.9	188.2	126.4	110.1	68.0	8.6	102.6
		1928	12.2	67	32	8.8	.4	1.1	3.5	5.5	2.6	93.4	.9	.7	1.5	43.8	102.6	23.7	155.8	120.8	226.0	194.4	108.9	89.0	67.5	7.7	98.6
Louisiana	January to March.	1930	13.6	99	64	11.4	5.8	8.7	.6	6.0	6.0	84.8	1.0	1.0	6.8	94.3	63.9	17.7	102.5	70.5	256.8	240.3	170.6	154.3	74.9	14.0	127.9
		1929	14.7	82	57	10.1	4.5	5.4	.4	6.0	5.2	255.8	.6	.4	3.3	103.6	63.7	16.1	102.5	65.2	252.9	233.7	162.6	148.3	75.7	19.6	118.4
		1928	13.5	86	57	11.4	8.3	16.9	.4	9.5	8.7	116.9	.2	1.9	1.4	103.5	59.4	15.9	100.2	69.5	214.7	201.3	175.9	161.1	79.4	18.6	121.9
Maryland	January to May	1930	14.1	66	33	5.2	1.9	.4	3.4	5.5	3.7	17.7	.1	1.0	2.5	113.5	110.7	24.7	153.2	115.0	308.1	271.9	187.5	169.3	66.1	10.1	171.1
Michigan	do	1930	12.0	73	33	6.9	1.1	9.5	4.4	4.0	8.6	19.7	.5	1.4	14.0	68.0	91.9	20.1	136.3	103.1	261.1	231.1	129.0	108.2	78.7	9.1	68.3
		1929	13.5	78	41	6.9	1.3	4.8	5.1	6.8	10.8	78.7	.7	1.5	25.4	76.6	94.0	22.7	147.4	105.0	282.6	248.2	158.5	138.5	84.1	12.4	73.1
Minnesota	do	1930	9.5	47	18	5.5	1.0	6.6	2.4	3.2	1.4	21.5	.4	1.4	2.8	46.8	108.6	18.6	103.1	79.5	189.4	173.2	89.2	85.7	63.1	5.4	52.7
		1929	10.3	59	25	4.8	.3	4.6	3.4	6.0	2.5	73.4	.4	2.3	2.0	56.1	104.3	19.5	104.3	77.5	201.3	153.3	94.3	87.4	62.3	3.8	58.1
		1928	10.0	(1)	(1)	(1)	.5	.5	3.4	1.9	2.8	47.6	.3	2.1	1.5	59.2	105.1	22.1	(1)	(1)	(1)	152.9	(1)	85.0	(1)	(1)	60.1
Mississippi	January to February.	1930	13.5	(1)	(1)	(1)	4.5	2.4	.3	7.9	9.3	80.1	1.4	(2)	11.1	87.0	47.7	13.1	(1)	85.0	(1)	125.7	(1)	133.7	(1)	7.6	106.0
		1929	18.8	(1)	(1)	(1)	4.8	8.6	(2)	10.7	6.2	553.4	.7	.3	1.0	78.4	46.6	9.0	(1)	79.8	(1)	109.2	(1)	151.3	(1)	3.5	108.5
Montana	January to April	1930	9.8	(1)	(1)	(1)	2.8	4.4	5.0	1.1	(2)	32.1	(2)	2.2	10.5	62.1	73.7	18.8	101.9	67.6	159.6	149.6	138.5	125.8	70.4	5.0	71.5
Nebraska	January	1930	9.7	45	19	4.3	.8	7.5	4.1	1.7	2.5	31.5	(2)	.8	6.6	31.5	102.0	25.7	117.7	96.2	203.1	179.1	115.3	106.1	62.2	6.6	44.8
		1929	12.2	79	50	8.6	3.3	(2)	6.6	3.3	5.0	218.1	(2)	(2)	.8	30.7	69.7	26.5	121.1	100.3	215.6	193.2	136.8	118.6	72.1	5.0	59.7
New Jersey	January to May	1930	12.1	(1)	(1)	(1)	.7	5.8	2.5	2.8	13.0	14.3	.2	1.1	2.4	76.8	106.3	27.9	121.6	90.1	293.1	265.9	136.1	123.3	73.3	9.0	112.1
		1929	13.3	73	(1)	5.8	.8	1.6	1.6	7.1	12.7	53.9	.3	1.5	3.0	79.7	107.7	25.6	127.9	94.0	313.3	289.2	187.2	168.7	73.5	9.2	113.9
		1928	12.9	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	21.1	(1)	(1)	(1)	77.1	107.3	(1)	126.7	(1)	284.6	(1)	74.4	98.2	61.7	10.9	115.3
		1927	12.3	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	20.3	(1)	(1)	(1)	82.3	102.0	(1)	132.9	(1)	262.1	(1)	67.3	82.6	65.1	14.1	105.5

[a] Alabama, District of Columbia, Iowa, Michigan, New Jersey, Tennessee, and Virginia.

[1] Not available.

[2] No deaths.

Death rates from certain causes in stated periods of 1930, with comparative data for corresponding periods in preceding years—Continued

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births			Rates per 100,000 population (annual basis)																				
				Infant mortality	All except malformations and early infancy	Maternal mortality (143–150)	Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31–37)	Cancer, all forms (43–49)	Diabetes (57)	Diseases of the nervous system (70–86)	Cerebral hemorrhage and apoplexy (74)	Diseases of the circulatory system (87–96)	Diseases of the heart (87–90)	Diseases of the respiratory system (97–107)	Pneumonia, all forms (100, 101)	Diseases of the digestive system (108–127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
New York [3]	January to April	1930	13.7	68	30	6.1	1.0	1.9	2.2	4.2	3 4	18.0	.3	.7	1.4	71.0	123.5	30.2	141.9	107.0	389.2	338.0	143.9	127.5	74.8	9.1	133.8
		1929	16.0	79	38	6.1	.7	4.7	3.5	5.2	3.5	99.0	.4	1.0	1.4	90 8	126.7	30.7	172.6	133.3	435.3	384.3	202.2	179.7	71.7	9.2	128.2
		1928	14.2	72	32	7.5	1.6	4.6	3.4	4.0	5.5	23.3	.3	1.1	.8	79.9	125.3	27.2	169.9	131.0	383.6	335.7	157.0	139.4	77.0	11.3	122.0
		1927	13.9	73	33	6.6	2.4	4.8	2.5	5.2	4.9	24.2	.1	.6	(2)	83.3	122.7	26.2	162.5	122.2	357.5	310.4	151.2	129.9	75.8	11.6	122.9
North Carolina	January to May	1930	12.9	82	(1)	7.5	1.0	.1	1.2	10.6	5.6	45.0	.3	.7	1.1	90.5	(1)	(1)	(1)	(1)	(1)	(1)	(1)	140.2	(1)	17.1	(1)
		1929	13.4	(1)	(1)	(1)	2.4	1.1	2.1	7.9	7.4	170.2	.9	(1)	.5	91.8	(1)	(1)	(1)	(1)	(1)	(1)	(1)	134.9	(1)	14.8	(1)
		1928	11.8	(1)	(1)	(1)	1.9	3.4	1.8	7.9	7.0	55.0	.7	.9	(1)	86.3	(1)	(1)	(1)	(1)	(1)	(1)	(1)	140.7	(1)	13.6	(1)
Ohio	January to April	1930	12.1	64	(1)	6.6	1.7	5.2	3.2	3.7	3.5	31.2	.4	1.2	2.5	69.6	102.5	23.7	125.1	112.6	277.7	247.5	125 2	112.8	56.0	6.0	83.2
		1929	14.0	(1)	(1)	(1)	.9	5.7	3.0	9.9	3.4	144.7	.6	(1)	2.9	73.5	99.1	(1)	(1)	117.9	(1)	246.0	(1)	143.3	(1)	6.3	92.1
		1928	12.2	(1)	(1)	(1)	1.2	4.9	2.8	2.3	7.0	43.6	.6	(1)	1.4	74.9	98.4	(1)	(1)	115.0	(1)	(1)	(1)	122.1	(1)	6.6	92.7
Pennsylvania	do	1930	12.4	84	49	6.6	1.0	3.4	2.9	5.2	6.4	33.7	.4	.8	2.8	66.4	92.7	23.7	120.8	90.5	287.5	257.1	160.1	143.0	68.8	12.3	109.9
		1929	14.4	91	54	6.9	1.1	6.7	3.6	7.7	8.3	134.7	.4	1.3	2.4	69.9	99.3	25.8	134.6	97.3	299.5	271.2	194.9	171.4	73.5	14.0	116.3
		1928	13.0	80	44	6.3	1.0	6.3	3.7	4.1	11.9	42.5	.6	1.2	.9	74.0	96.4	24.0	(1)	97.5	(1)	250.0	(1)	156.9	(1)	16.6	116.0
		1927	13.0	83	45	7.0	1.9	4.3	4.0	6.5	9.8	45.1	(1)	1.3	.4	78.1	94.1	21.1	(1)	93.3	(1)	243.9	(1)	152.2	(1)	17.3	114.9
South Carolina	January to May	1930	(1)	(1)	(1)	(1)	6.4	.3	.3	11.9	4.6	57.4	.6	2.6	5.6	72.5	33.5	8.2	(1)	(1)	301.8	(1)	(1)	124.3	(1)	(1)	105.3
		1929	(1)	(1)	(1)	(1)	5.8	.1	10.5	9.9	4.9	145.6	.6	2.8	2.7	72.7	37.2	7.8	(1)	(1)	279.5	(1)	(1)	111.4	(1)	(1)	90.1
		1928	(1)	(1)	(1)	(1)	4.4	32.9	.1	10.5	5.7	68.5	.9	2.7	1.8	84.4	41.3	9.6	(1)	(1)	277.1	(1)	(1)	146.6	(1)	(1)	98.8
		1927	(1)	(1)	(1)	(1)	8.9	2.9	(2)	7.9	4.1	25.7	.9	3.0	2.0	85.8	37.3	7.6	(1)	(1)	268.7	(1)	(1)	131.5	(1)	(1)	85.9
South Dakota	January to February.	1930	7.4	61	27	7.6	1.7	2.6	(2)	2.6	2.6	30.4	.9	(2)	(2)	30.4	66.9	19.1	71.2	41.7	125.1	104.3	75.6	66.0	44.3	5.2	50.4
		1929	10.1	91	53	8.1	3.5	(2)	3.5	2.6	.9	187.7	3.5	.9	1.7	54.7	57.3	20.0	79.9	50.4	154.7	140.8	130.3	110.3	58.2	3.5	32.1
		1928	7.9	71	35	5.3	1.7	1.7	3.5	6.1	2.6	24.3	(1)	(1)	(1)	74.5	57.2	13.0	94.4	49.4	112.6	89.2	85.8	72.8	60.7	9.5	29.5
Tennessee	January to May	1930	12.1	74	46	9.3	3.6	8.3	1.6	7.0	3.8	57.2	.9	1.0	18.1	125.8	54.2	11.7	108.2	63.1	143.1	128.1	137.0	125.1	69.4	7.9	85.2
		1929	13.8	93	67	9.6	3.1	.5	3.0	7.0	4.6	230.1	1.0	.5	2.3	140.1	56.2	10.7	106.9	60.5	152.6	141.1	143.3	130.1	62.1	6.6	73.1
		1928	12.5	(1)	(1)	(1)	4.1	16.6	1.8	6.2	3.9	88.4	1.3	.6	.5	135.6	55.8	11.2	(1)	(1)	(1)	124.1	(1)	151.1	(1)	5.7	(1)
		1927	11.5	(1)	(1)	(1)	9.1	7.6	2.0	15.7	4.7	51.1	.4	.4	.5	142.5	(1)	(1)	(1)	(1)	(1)	(1)	(1)	111.7	(1)	10.6	(1)

Virginia	Do	1930	11.5	71	(1)	7.1	1.1	6.3	1.5	12.7	4.9	44.3	.6	1.3	3.2	86.7	58.9	14.9	122.9	94.4	205.4	185.6	123.6	107.4	58.0	9.0	103.6
		1929	12.8	87	(1)	8.1	2.2	2.6	.9	9.7	4.7	186.8	.6	1.4	1.9	94.4	58.9	10.9	129.7	91.4	203.5	185.4	108.3	95.6	49.8	6.0	95.9
West Virginia	January to April	1930	10.3	(1)	(1)	6.6	5.7	7.8	2.6	17.5	5.7	45.7	.5	.5	1.4	73.3	55.9	11.5	89.4	59.0	158.3	123.3	132.3	121.7	56.2	14.4	59.4
		1929	12.5	(1)	(1)	6.1	8.2	4.7	1.4	13.5	4.2	233.9	.5	.9	1.6	72.7	60.1	10.2	94.4	52.6	174.3	117.0	157.3	130.0	56.1	14.1	60.9
Wisconsin	January to May	1930	10.8	63	(1)	(1)	.3	5.9	4.7	3.6	2.4	22.6	.3	.8	2.9	53.9	113.1	(1)	(1)	(1)	(1)	(1)	(1)	94.6	(1)	8.2	(1)
		1929	17.1	76	(1)	(1)	1.1	3.9	3.2	4.2	2.6	85.4	.2	1.8	5.7	54.7	101.4	(1)	(1)	(1)	(1)	(1)	(1)	105.6	(1)	12.9	(1)
		1928	(1)	68	(1)	(1)	.8	.6	3.0	2.0	3.4	47.2	.7	1.9	4.2	61.6	(1)	(1)	(1)	(1)	(1)	(1)	(1)	103.9	(1)	12.6	(1)

[1] Not available. [2] No deaths. [3] Exclusive of New York City.

COURT DECISION RELATING TO PUBLIC HEALTH

State tuberculosis hospitals required to be maintained by State.—(Oklahoma Supreme Court; St. Louis-San Francisco Ry. Co. *v.* Morris, County Treasurer, 288 P. 306; decided May 13, 1929.) A State law provided as follows:

For the purpose of defraying the expense of transportation, and treatment of patients afflicted with tuberculosis at the district sanatoria herein provided for, the excise board of each county is authorized to make an annual levy upon all property in the county, subject to taxes, on an ad valorem basis, of not exceeding 1 mill per annum, which is hereby declared not to be a current expense and to be for a special purpose, known as "tuberculosis fund," in addition to the maxium levy for current expenses now provided by law.

It was contended that this statute was unconstitutional because violative of article 21 of the State constitution which was as follows:

Educational, reformatory, and penal institutions and those for the benefit of the insane, blind, deaf, and mute, and such other institutions as the public good may require, shall be established and supported by the State in such manner as may be prescribed by law.

In its opinion the supreme court said:

We think that institutions for the treatment of tuberculosis are not for the care of aged, infirm, or misfortunate, as provided in section 3, article 17, of the constitution, and that they are, by clear implication, included in the meaning of article 21, supra.

Under the rule announced by this court in the case of Board of Commissioners of Logan County *v.* State ex rel. Short, supra, article 21, supra, places the burden of maintaining such institutions upon the State, and the legislature is without authority to make the counties of the State liable for any portion of the expenses necessary to their maintenance.

DEATHS DURING WEEK ENDED JULY 19, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended July 19, 1930, and corresponding week of 1929. (From the Weekly Health Index, July 24, 1930, issued by the Bureau of the Census, Department of Commerce)

	Week ended July 19, 1930	Corresponding week, 1929
Policies in force	76, 031, 789	74, 516, 810
Number of death claims	12, 065	13, 061
Death claims per 1,000 policies in force, annual rate	8. 3	9. 1

Deaths from all causes in certain large cities of the United States during the week ended July 19, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the weekly Health Index, July 24, 1930, issued by the Bureau of the Census, Department of Commerce)

City	Week ended July 19, 1930		Annual death rate per 1,000, corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended July 19, 1930 [2]
	Total deaths	Death rate [1]		Week ended July 19, 1930	Corresponding week, 1929	
Total (64 cities)	6,294	11.2	10.4	574	570	[3] 51
Akron	34			4	10	37
Albany [4]	31	13.4	17.3	3	1	66
Atlanta	87	17.8	14.3	19	10	201
White	41			7	4	222
Colored	46	([5])	([5])	12	6	190
Baltimore [4]	168	10.5	9.6	13	13	44
White	120			7	9	30
Colored	48	([5])	([5])	6	4	97
Birmingham	92	21.6	14.3	11	8	103
White	46			5	5	77
Colored	46	([5])	([5])	6	3	142
Boston	146	9.5	11.9	14	25	39
Bridgeport	37			3	2	51
Buffalo	122	11.4	12.9	15	11	67
Cambridge	13	5.4	7.5	0	1	0
Camden	28	10.8	8.9	1	4	18
Canton	15	6.7	6.7	4	2	99
Chicago [4]	572	9.4	10.0	34	45	30
Cincinnati	118			4	12	24
Cleveland	159	8.2	8.3	15	19	45
Columbus	71	12.4	13.3	5	5	49
Dallas	57	13.6	13.9	11	6	
White	47			10	5	
Colored	10	([5])	([5])	1	1	
Dayton	44	12.4	11.0	7	2	103
Denver	80	14.2	12.1	13	9	136
Des Moines	32	11.0	9.3	2	0	35
Detroit	261	9.9	10.1	31	40	48
Duluth	17	7.6	12.1	3	0	81
El Paso	30	13.3	13.7	11	6	
Erie	18			3	1	64
Fall River [4]	20	7.8	6.6	1	2	23
Flint	20	7.0	6.7	2	3	23
Fort Worth	23	7.0	13.1	3	7	
White	11			1	7	
Colored	12	([5])	([5])	2	0	
Grand Rapids	26	8.3	8.9	4	2	61
Houston	68			6	5	
White	42			6	3	
Colored	26	([5])	([5])	0	2	
Indianapolis	86	11.7	8.9	10	2	75
White	66			6	1	52
Colored	20	([5])	([5])	4	1	215
Jersey City	63	10.1	7.4	6	4	52
Kansas City, Kans.	25	11.0	13.2	0	4	0
White	15			0	2	0
Colored	10	([5])	([5])	0	2	0
Knoxville	22	10.9	12.9	5	4	117
White	16			4	3	104
Colored	6	([5])	([5])	1	1	247
Los Angeles	318			27	28	82
Louisville	67	10.6	10.4	4	8	35
White	51			4	5	40
Colored	16	([5])	([5])	0	3	0
Lowell	20			4	1	95
Lynn	16	7.9	12.4	1	3	25
Memphis	138	37.8	17.3	10	4	119
White	64			3	3	55
Colored	74	([5])	([5])	7	1	236
Milwaukee	87	8.3	9.1	4	21	20
Minneapolis	95	10.9	8.2	4	3	28

[1] Annual rate per 1,000 population.
[2] Deaths under 1 year per 1,000 births. Cities left blank are not in the registration area for births.
[3] Data for 72 cities.
[4] Deaths for week ended Friday.
[5] In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

Deaths from all causes in certain large cities of the United States during the week ended July 19, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, July 24, 1930, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended July 19, 1930		Annual death rate per 1,000, corresponding weeks, 1929	Deaths under 1 year		Infant mortality rate, week ended July 19, 1930
	Total deaths	Death rate		Week ended July 19, 1930	Corresponding week, 1929	
Nashville	53	19.8	18.3	5	6	77
White	29			3	4	62
Colored	24	(5)	(5)	2	2	12
New Bedford	18			1	1	26
New Haven	28	7.8	7.5	3	2	58
New Orleans	128	15.5	17.6	10	7	58
White	73			6	4	53
Colored	55	(5)	(5)	4	3	67
New York	1,219	10.6	9.9	118	106	50
Bronx borough	173	9.5	8.8	11	21	26
Brooklyn borough	379	8.6	8.3	35	31	37
Manhattan borough	493	14.7	13.1	55	41	90
Queens Borough	133	8.1	7.9	15	10	43
Richmond Borough	41	14.2	14.9	2	3	37
Newark, N. J	78	8.6	9.1	8	8	42
Oakland	55	10.5	9.7	2	4	24
Oklahoma City	36			10	4	196
Omaha	84	19.7	10.8	6	3	68
Paterson	21	7.6	8.3	2	2	35
Philadelphia	382	9.6	9.8	36	31	53
Pittsburgh	148	11.5	11.6	15	16	55
Portland, Oreg	73			5	2	61
Providence	54	9.8	10.6	5	10	46
Richmond	39	10.5	14.5	3	5	44
White	16			0	1	0
Colored	23	(5)	(5)	3	4	131
Rochester	62	9.9	9.1	6	7	53
St. Louis	442	27.2	11.5	28	12	91
St. Paul	54			2	2	20
Salt Lake City [4]	29	11.0	12.5	3	2	47
San Antonio	57	13.6	15.8	9	14	
San Diego	44			2	1	42
San Francisco	170	15.1	12.1	5	7	34
Schenectady	22	12.3	10.1	2	4	62
Seattle	64	8.7	7.8	4	3	40
Somerville	11	5.6	5.1	1	1	33
Spokane	28	13.4	14.3	1	2	26
Springfield, Mass	30	10.4	8.0	1	1	16
Syracuse	30	7.8	7.6	3	6	37
Tacoma	15	7.1	9.4	2	0	51
Toledo	49	8.2	10.3	8	3	73
Trenton	25	9.4	14.3	3	3	56
Utica	31	15.5	13.0	2	6	57
Washington, D. C	119	11.2	9.4	9	9	52
White	64			6	3	52
Colored	55	(5)	(5)	3	6	53
Waterbury	19			2	2	51
Wilmington, Del	25	10.1	7.7	1	3	23
Worcester	37	9.8	11.6	2	5	26
Yonkers	17	7.3	9.0	3	1	72
Youngstown	29	8.7	8.4	2	7	31

[4] Deaths for week ended Friday.
[5] In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 29; Dallas, 15; Forth Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15, Loui, ville, 17; Memphis 38; Nashville, 30; New Orleans, 28; Richmond, 32; and Washington, D. C., 28.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended July 19, 1930, and July 20, 1929

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 19, 1930, and July 20, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 19, 1930	Week ended July 20, 1929	Week ended July 19, 1930	Week ended July 20, 1929	Week ended July 19, 1930	Week ended July 20, 1929	Week ended July 19, 1930	Week ended July 20, 1929
New England States:								
Maine	6		1		3	50	0	1
New Hampshire					8	25	0	0
Vermont	1	1			2	16	0	0
Massachusetts	32	51	1		206	165	1	3
Rhode Island	1	3			7	13	0	0
Connecticut	20	10	1	1	17	22	5	2
Middle Atlantic States:								
New York	68	123	[1] 3	[1] 7	536	875	10	16
New Jersey	46	83	1	2	273	58	6	6
Pennsylvania	70	74			329	311	7	8
East North Central States:								
Ohio	14	20	2	3	73	131	8	5
Indiana	13	9	3		22	37	3	0
Illinois	90	137	2	37	88	347	7	14
Michigan	48	90		2	185	176	9	34
Wisconsin	7	21	6	1	213	333	2	2
West North Central States:								
Minnesota	9	16		1	32	39	0	1
Iowa		5			9	16	1	0
Missouri	16	24	3		22	15	5	3
North Dakota	3	7			11	47	0	0
South Dakota	4	3			12	5	2	0
Nebraska	4	2			15	49	1	0
Kansas	2	11	1		45	112	4	2
South Atlantic States:								
Delaware		3			1	2	0	0
Maryland [2]	11	11		2	8	12	1	1
District of Columbia	9	2			27	5	0	1
Virginia								
West Virginia	4	3	9	5	28	23	0	0
North Carolina	23	17	17		38	4	2	2
South Carolina	7	21	66	129		7	0	0
Georgia	4	3	3	8	21	4	2	0
Florida	12	9	2	1	23	4	0	0

[1] New York City only.
[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 19, 1930, and July 20, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 19, 1930	Week ended July 20, 1929	Week ended July 19, 1930	Week ended July 20, 1929	Week ended July 19, 1930	Week ended July 20, 1929	Week ended July 19, 1930	Week ended July 20, 1929
East South Central States:								
Kentucky	-------	-------	-------	-------	-------	6	0	0
Tennessee	3	5	5	-------	10	5	0	3
Alabama	6	22	3	3	43	18	1	1
Mississippi	13	4	-------	-------	-------	-------	3	0
West South Central States:								
Arkansas	1	6	8	-------	6	2	0	2
Louisiana	9	7	2	4	3	11	1	1
Oklahoma [4]	2	5	8	21	7	13	0	0
Texas	14	20	2	7	46	12	1	0
Mountain States:								
Montana	1	-------		-------	3	7	2	0
Idaho	-------	-------	-------	2	-------	2	2	2
Wyoming	1	-------	-------	-------	9	5	0	1
Colorado	9	5	-------	-------	52	3	1	1
New Mexico	4	4	-------	-------	5	1	0	0
Arizona	1	1	-------	-------	48	-------	2	3
Utah [3]	-------	1	4	1	8	3	2	0
Pacific States:								
Washington	5	5	-------	-------	109	41	1	0
Oregon	1	5	3	1	29	24	2	1
California	43	37	21	5	326	39	1	15

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 19, 1930	Week ended July 20, 1929	Week ended July 19, 1930	Week ended July 20, 1929	Week ended July 19, 1930	Week ended July 20, 1929	Week ended July 19, 1930	Week ended July 20, 1929
New England States:								
Maine	0	1	16	5	0	0	0	4
New Hampshire	1	0	7	2	0	0	0	0
Vermont	0	1	3	2	0	1	0	0
Massachusetts	6	2	50	67	0	0	3	7
Rhode Island	0	1	3	2	0	0	0	0
Connecticut	0	0	8	9	0	0	2	1
Middle Atlantic States:								
New York	12	13	81	81	1	1	16	21
New Jersey	2	2	21	37	0	0	3	15
Pennsylvania	1	0	103	114	1	0	20	15
East North Central States:								
Ohio	5	0	50	66	33	31	18	8
Indiana	5	0	22	36	58	54	12	6
Illinois	2	1	83	127	43	58	22	20
Michigan	0	1	85	201	28	41	9	2
Wisconsin	1	1	42	64	70	8	1	2
West North Central States:								
Minnesota	10	3	19	30	4	1	7	7
Iowa	2	0	9	31	53	27	2	1
Missouri	0	0	13	10	11	11	21	18
North Dakota	0	0	1	-------	2	6	1	2
South Dakota	2	0	2	3	9	8	0	0
Nebraska	0	0	6	23	13	11	2	1
Kansas	5	1	16	-------	22	22	15	8
South Atlantic States:								
Delaware	0	0	1	1	0	0	2	1
Maryland [3]	0	2	13	17	0	0	14	12
District of Columbia	0	0	5	17	0	0	2	3
Virginia	-------	1	-------	-------	-------	-------	-------	-------
West Virginia	1	0	17	10	5	2	21	13
North Carolina	7	14	27	25	6	2	78	89
South Carolina	1	4	5	14	0	1	85	161
Georgia	0	0	6	7	0	0	86	48
Florida	0	0	0	4	0	0	12	1

[3] Week ended Friday. [4] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 19, 1930, and July 20, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 19, 1930	Week ended July 20, 1929	Week ended July 19, 1930	Week ended July 20, 1929	Week ended July 19, 1930	Week ended July 20, 1929	Week ended July 19, 1930	Week ended July 20, 1929
East South Central States:								
Kentucky	1	0	6		0	5	13	7
Tennessee	1	10	4	10	4	4	64	72
Alabama	1	2	11	9	2	0	43	54
Mississippi	2	1	2	1	4	1	39	43
West South Central States:								
Arkansas	4	0	0	2	1	6	30	12
Louisiana	15	0	3	13	17	0	24	38
Oklahoma [2]	1	0	4	11	34	15	48	46
Texas	4	0	10	12	9	5	24	20
Mountain States:								
Montana	0	1	4	9	2	7	2	3
Idaho	0	0	0	1	3	4	0	2
Wyoming	0	0	4	10	8	1	0	0
Colorado	0	0	9	8	2	6	4	3
New Mexico	0	0	4	3	1	1	11	4
Arizona	1	0	0		1	0	6	8
Utah [1]	0	0	1	3	0	3	1	9
Pacific States:								
Washington	3	0	5	6	20	18	2	2
Oregon	2	0	1	4	12	16	7	4
California	98	5	40	96	18	16	15	10

[1] Week ended Friday. [2] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June, 1930										
Illinois	28	553	124	12	1,777		4	1,120	327	51
Michigan	75	259	6	1	3,514	1	2	918	230	21
Minnesota	4	60	6		437		17	207	24	7
Missouri	24	97	8	52	315	1	3	352	196	41
New York	42	478		11	8,618		10	1,069	30	63
Pennsylvania	38	345		2	3,984	2	7	973	0	65
West Virginia	6	23	21		199		1	72	38	36

June, 1930

	Cases
Anthrax:	
New York	1
Chicken pox:	
Illinois	839
Michigan	742
Minnesota	355
Missouri	196
New York	1,894
Pennsylvania	1,323
West Virginia	60
Dysentery:	
Illinois	39
Minnesota (amebic)	2
New York	3
German measles:	
Illinois	133
New York	876
Pennsylvania	479
Lead poisoning:	
Illinois	7
Lethargic encephalitis:	
Illinois	5
Michigan	3
Minnesota	1
New York	4
Pennsylvania	8
Mumps:	
Illinois	726
Michigan	565

Mumps—Continued.	Cases
Missouri	118
New York	1,498
Pennsylvania	924
Ophthalmia neonatorum:	
Illinois	25
New York	5
Pennsylvania	16
Paratyphoid fever:	
Illinois	4
New York	8
Puerperal septicemia:	
Illinois	8
New York	6
Pennsylvania	20
Rabies in animals:	
Illinois	4
Missouri	7
New York	23
Rabies in man:	
Illinois	2
New York	2
Septic sore throat:	
Illinois	5
Michigan	29
Missouri	6
New York	19
Tetanus:	
Illinois	6
Missouri	1
New York	4
Pennsylvania	1

Trachoma:	Cases
Illinois	4
Minnesota	1
Missouri	136
New York	2
Trichinosis:	
Pennsylvania	2
Tularaemia:	
Illinois	2
Minnesota	1
Typhus fever:	
New York	1
Pennsylvania	1
Undulant fever:	
Illinois	8
Michigan	1
Minnesota	5
Missouri	18
New York	7
Pennsylvania	1
Vincent's angina:	
Illinois	1
New York [1]	80
Whooping cough:	
Illinois	783
Michigan	1,004
Minnesota	110
Missouri	124
New York	1,445
Pennsylvania	857
West Virginia	154

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of June, 1930, by departments of health of certain States to other State health departments

Disease	California	Illinois	Minnesota	New York	Oregon
Measles				1	
Scarlet fever				1	
Smallpox		6	1		
Tuberculosis	1		60		5
Typhoid fever		3	1		
Undulant fever			1		

PATIENTS IN INSTITUTIONS FOR THE CARE OF EPILEPTICS, JULY TO SEPTEMBER, 1929

Reports for the third quarter of the year have been received from 10 institutions for the care and treatment of epileptics, located in 10 States. The total number of patients in these institutions on September 30, 1929, including those on parole or otherwise absent but still on books, was 7,932.

The first admissions were as follows:

	Male	Female	Total
July	71	40	111
August	59	41	100
September	76	48	124
Total	206	129	335

[1] Exclusive of New York City.

Of the new admissions during the three months 61.5 per cent were males and 38.5 per cent were females, giving a ratio of 160 males per 100 females.

On September 30, 1929, there were 4,165 male and 3,767 female patients on the books of the institutions, giving a ratio of 111 males per 100 females.

During the quarter 319 patients were discharged—217 males and 102 females. Seventy-two males and 46 females died.

The annual death rates, based on the estimated population of the institutions the middle of August, were: Males, 68.3 per 1,000; females, 48.6 per 1,000; persons, 59 per 1,000.

The following table shows for the 10 institutions the number of patients in the hospitals and on parole at the end of each month of the third quarter of the year.

	July 31, 1929	August 31, 1929	September 30, 1929
Patients in hospitals:			
Male	3,863	3,892	3,944
Female	3,547	3,572	3,602
Total	7,410	7,464	7,546
Patients on parole:			
Male	344	261	221
Female	219	181	165
Total	563	442	386
Total patients:			
Male	4,207	4,153	4,165
Female	3,766	3,753	3,767
Total	7,973	7,906	7,932
Per cent of total patients on parole:			
Male	8.2	6.3	5.3
Female	5.8	4.8	4.4
Total	7.1	5.6	4.9

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,040,000. The estimated population of the 90 cities reporting deaths is more than 30,480,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended July 12, 1930, and July 13, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	782	988	-----------
96 cities	365	534	531
Measles:			
45 States	4, 980	3, 822	-----------
96 cities	1, 586	911	-----------
Meningococcus meningitis:			
46 States	75	123	-----------
96 cities	45	82	-----------
Poliomyelitis:			
46 States	213	43	-----------
Scarlet fever:			
46 States	1, 227	1, 339	-----------
96 cities	443	506	397
Smallpox:			
46 States	580	410	-----------
96 cities	43	51	58
Typhoid fever:			
46 States	655	595	-----------
96 cities	99	84	97
Deaths reported			
Influenza and pneumonia:			
90 cities	337	331	-----------
Smallpox:			
90 cities	0	0	-----------

City reports for week ended July 12, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	0	----------	0	0	9	2
New Hampshire:								
Concord	0	0	0	----------	0	0	0	0
Nashua	0	0	0	----------	0	2	0	0
Vermont:								
Barre	1	0	0	----------	0	9	0	0
Massachusetts:								
Boston	21	26	11	----------	0	141	9	13
Fall River	3	2	3	----------	0	2	1	0
Springfield	3	1	1	----------	0	2	2	0
Worcester	3	1	1	----------	0	33	0	0
Rhode Island:								
Pawtucket	0	1	0	----------	0	0	0	0
Providence	0	3	1	----------	0	3	0	2
Connecticut:								
Bridgeport	0	3	0	----------	0	0	0	0
Hartford	0	2	0	----------	0	0	0	1
New Haven	0	1	0	----------	0	0	3	0

City reports for week ended July 12, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC								
New York:								
Buffalo	10	8	7		0	17	6	9
New York	44	154	66	1	3	486	29	74
Rochester	5	4	4		0	3	1	1
Syracuse	0	2	0		0	38	2	1
New Jersey:								
Camden	1	3	0	1	0	9	0	0
Newark	6	9	7	2	0	28	5	1
Trenton	0	1	1		0	0	0	0
Pennsylvania:								
Philadelphia	22	35	13	6	5	80	40	17
Pittsburgh	3	13	10	61	0	10	0	16
Reading	0	1	0		0	2	2	1
Scranton	1	2	1		0	0	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	3	4	1		0	14	1	5
Cleveland	56	17	9	3	2	6	22	3
Columbus	5	3	5		0	16	0	1
Toledo	26	3	2		0	7	4	3
Indiana:								
Fort Wayne	0	2	0		0	0	0	0
Indianapolis	3	2	1		0	12	1	12
South Bend		1						
Terre Haute	0	0	0		0	10	0	1
Illinois:								
Chicago	41	62	83	2	1	26	26	23
Springfield	0	0	0		0	8	0	1
Michigan:								
Detroit	14	30	38		1	60	14	7
Flint	8	2	0		0	58	0	0
Grand Rapids	0	1	0		0	0	0	2
Wisconsin:								
Kenosha	4	1	0		0	0	0	0
Madison	3	0	0			6	0	
Milwaukee	41	8	2	1	1	31	26	1
Racine	0	1	0		0	5	0	1
Superior	2	0	0		0	0	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	2	0	0		0	8	0	1
Minneapolis	5	9	5		1	3	2	6
St. Paul	32	5	0		0	1	0	8
Iowa:								
Davenport	5	0	0			0	0	
Des Moines	0	0	0			0	0	
Sioux City	2	1	0			1	2	
Waterloo	0	0	0			0	0	
Missouri:								
Kansas City	2	2	0		0	0	0	8
St. Joseph	0	0	0		0	0	0	0
St. Louis	0	18	20			39	3	
North Dakota:								
Fargo	0	0	0		0	0	3	1
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	4	0	0			6	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	0	2	9		0	4	0	4
Kansas:								
Topeka	6	0	1		1	3	3	0
Wichita	0	0	0		0	8	0	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	0	2		0	2	0	0
Maryland:								
Baltimore	24	11	8		0	4	1	14
Cumberland	0	0	0		0	1	0	0
Frederick	0	0	0		0	0	0	0

City reports for week ended July 12, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
SOUTH ATLANTIC—continued								
District of Columbia:								
Washington	2	4	4		0	22	0	3
Virginia:								
Lynchburg	2	0	0		0	5	1	0
Norfolk	1	0	0		0	0	1	8
Richmond	0	1	1		0	5	1	1
Roanoke	2	1	0		0	8	0	1
West Virginia:								
Charleston	0	0	0		0	0	0	1
Wheeling	1	0	0		0	2	0	0
North Carolina:								
Raleigh	0	0	0		0	1	0	0
Wilmington	0	0	0		0	0	0	1
Winston-Salem	0	0	0		0	0	0	1
South Carolina:								
Charleston	0	0	0		0	0	0	1
Columbia	0	0	0		0	3	3	2
Georgia:								
Atlanta	0	2	0	3	1	10	3	5
Brunswick	0	0	0		0	0	0	0
Savannah	0	0	1	2	0	0	0	0
Florida:								
Miami	0	1	2		0	1	1	1
St. Petersburg		0			0			1
Tampa	0	0	0		0	8	2	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	1	0	0
Tennessee:								
Memphis	1	1	1		0	0	0	3
Nashville	0	0	2		1	11	0	5
Alabama:								
Birmingham	1	1	0		1	18	0	2
Mobile	0	0	0		0	0	0	1
Montgomery	1	0	1			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith		0						
Little Rock	0	0	0		0	0	0	0
Louisiana:								
New Orleans	0	5	9	3	2	1	0	9
Shreveport	0	0	0		0	1	0	3
Oklahoma:								
Tulsa	0	0	0			1	0	
Texas:								
Dallas	1	2	4		0	1	0	3
Fort Worth	0	1	0		0	0	1	4
Galveston	0	1	0		0	0	0	0
Houston	0	2	2		0	2	0	4
San Antonio	0	1	2		0	0	0	3
MOUNTAIN								
Montana:								
Billings	0	0	0		0	2	0	0
Great Falls	0	0	0		0	0	0	0
Helena	1	0	0		0	0	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	1	0	0
Colorado:								
Denver	8	7	3		0	17	5	10
Pueblo	4	1	0		0	30	5	0
New Mexico:								
Albuquerque	0	0	0		0	0	1	0
Arizona:								
Phoenix	0	0	0		0	0	0	0
Utah:								
Salt Lake City	7	2	0		0	16	2	2
Nevada:								
Reno	0	0	0		0	0	0	0

City reports for week ended July 12, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
PACIFIC								
Washington:								
Seattle	10	2	----------	0	----------	80	25	----------
Spokane	9	1	2	3	----------	20	0	----------
Tacoma	4	2	2	----------	0	4	0	0
Oregon:								
Portland	6	4	2	----------	0	7	2	6
Salem	0	0	1	----------	0	2	1	0
California:								
Los Angeles	19	33	12	6	1	114	50	15
Sacramento	1	2	5	----------	0	6	3	3
San Francisco	15	9	5	3	0	14	9	2

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	0	1	0	0	0	0	0	0	0	3	18
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	4
Nashua	0	0	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	26	16	0	0	0	9	2	1	0	60	170
Fall River	2	0	0	0	0	4	1	0	0	4	22
Springfield	2	0	0	0	0	2	0	0	0	3	31
Worcester	3	5	0	0	0	1	0	0	0	5	45
Rhode Island:											
Pawtucket	0	1	0	0	0	0	0	0	0	0	12
Providence	3	5	0	0	0	5	0	1	0	4	56
Connecticut:											
Bridgeport	2	1	0	0	0	4	0	0	0	0	29
Hartford	2	0	0	0	0	2	0	0	0	0	--------
New Haven	1	1	0	0	0	1	1	0	0	6	30
MIDDLE ATLANTIC											
New York:											
Buffalo	11	13	0	0	0	11	0	1	0	16	124
New York	60	32	1	0	0	87	19	15	0	79	1,248
Rochester	2	4	0	0	0	1	1	0	0	10	55
Syracuse	3	4	0	0	0	0	0	0	0	48	27
New Jersey:											
Camden	0	2	0	0	0	2	0	1	0	0	22
Newark	8	5	0	0	0	8	1	0	0	14	98
Trenton	0	3	0	0	0	3	1	2	0	3	30
Pennsylvania:											
Philadelphia	29	31	0	0	0	23	4	3	0	22	391
Pittsburgh	13	13	0	0	0	0	2	0	0	31	152
Reading	1	0	0	0	0	0	0	0	0	5	28
Scranton	0	0	0	0	0	0	1	0	0	5	--------
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	5	3	0	2	0	11	1	0	0	8	122
Cleveland	17	14	1	0	0	17	2	0	0	77	175
Columbus	2	3	1	0	0	3	1	1	0	6	68
Toledo	5	4	0	3	0	4	0	0	0	2	88
Indiana:											
Fort Wayne	0	0	1	2	0	0	0	0	1	3	20
Indianapolis	3	6	2	6	0	6	1	4	0	21	--------
South Bend	0	--------	0	--------	--------	--------	1	--------	--------	--------	--------
Terre Haute	1	0	0	0	0	0	0	0	0	0	17

City reports for week ended July 12, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
EAST NORTH CENTRAL—contd.											
Illinois:											
Chicago	46	83	2	2	0	36	4	2	0	92	578
Springfield	1	0	0	0	0	1	1	0	0	3	27
Michigan:											
Detroit	35	41	1	1	0	32	3	2	0	80	256
Flint	4	12	0	1	0	1	0	0	0	13	22
Grand Rapids	4	2	0	0	0	0	0	0	2	7	32
Wisconsin:											
Kenosha	1	0	1	0	0	0	0	0	0	16	2
Madison	0	2	0	0	------	------	0	0	------	9	------
Milwaukee	9	10	0	0	0	10	0	0	0	57	101
Racine	2	5	0	0	0	0	0	0	0	10	12
Superior	2	1	0	0	0	0	0	0	0	0	12
WEST NORTH CENTRAL											
Minnesota:											
Duluth	3	1	0	0	0	4	0	0	0	12	33
Minneapolis	13	14	0	0	0	4	0	1	0	0	107
St. Paul	8	2	0	0	0	4	0	0	0	5	59
Iowa:											
Davenport	0	0	0	21	------	------	0	0	------	0	------
Des Moines	2	0	1	16	------	------	0	0	------	0	31
Sioux City	1	2	1	1	------	------	0	0	------	2	------
Waterloo	1	0	0	2	------	------	0	0	------	4	------
Missouri:											
Kansas City	2	3	1	0	0	7	2	0	0	1	97
St. Joseph	0	3	0	0	0	1	0	0	0	1	35
St. Louis	9	17	0	0	0	9	4	4	0	18	236
North Dakota:											
Fargo	0	0	0	0	0	0	0	0	0	14	10
Grand Forks	1	0	0	0	------	------	0	0	------	2	------
South Dakota:											
Aberdeen	1	0	0	2	------	------	0	0	------	2	------
Sioux Falls	0	0	0	2	------	------	0	0	------	0	8
Nebraska:											
Omaha	1	2	1	2	0	1	0	0	0	0	65
Kansas:											
Topeka	1	0	0	0	0	0	0	0	0	26	17
Wichita	0	0	1	0	0	0	0	0	0	4	35
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	4	0	0	0	0	0	0	0	6	20
Maryland:											
Baltimore	8	14	0	0	0	12	4	3	1	35	189
Cumberland	0	1	0	0	0	0	0	0	0	1	7
Frederick	0	0	0	0	0	0	0	0	0	0	------
District of Col.:											
Washington	5	6	0	0	0	8	2	1	1	15	142
Virginia:											
Lynchburg	1	1	0	0	0	1	0	3	1	12	11
Norfolk	1	0	0	0	0	1	1	0	0	3	------
Richmond	1	1	0	0	0	1	1	3	0	1	41
Roanoke	0	0	0	0	0	0	1	0	0	2	13
West Virginia:											
Charleston	0	0	0	0	0	1	1	0	0	5	15
Wheeling	1	0	0	0	0	1	0	0	0	13	13
North Carolina:											
Raleigh	0	0	0	0	0	1	0	0	1	5	20
Wilmington	0	1	0	0	0	2	0	0	0	6	26
Winston-Salem	0	0	0	0	0	2	1	0	0	5	19
South Carolina:											
Charleston	0	2	0	0	0	1	1	0	0	0	17
Columbia	0	0	0	0	0	1	0	0	0	1	29
Georgia:											
Atlanta	2	2	0	0	0	4	3	15	1	1	88
Brunswick	0	0	0	0	0	0	0	0	0	0	5
Savannah	0	2	0	0	0	0	0	4	0	1	30
Florida:											
Miami	0	0	0	0	0	0	1	0	0	0	16
St. Petersburg	0	------	0	------	0	1	0	------	0	------	14
Tampa	0	0	0	0	0	1	0	1	0	2	15

City reports for week ended July 12, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	0	0	0	0	2	0	0	0	0	26
Tennessee:											
Memphis	1	6	1	0	0	7	6	7	0	6	78
Nashville	0	1	0	3	0	0	5	4	4	0	73
Alabama:											
Birmingham	2	0	1	0	0	6	3	1	0	11	59
Mobile	0	0	1	0	0	2	0	0	1	0	27
Montgomery	0	0	0	0			0	2		0	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0		1				0				
Little Rock	0	1	1	1	0	2	2	0	0	0	
Louisiana:											
New Orleans	3	6	0	0	0	14	3	4	1	13	155
Shreveport	0	0	0	0	0	4	1	1	1	0	36
Oklahoma:											
Tulsa	1	1	0	0			2	0		8	
Texas:											
Dallas	1	3	0	0	0	3	5	2	0	9	56
Fort Worth	1	1	0	0	0	2	1	2	0	0	38
Galveston	0	0	0	0	0	1	0	0	1	0	10
Houston	1	0	1	1	0	3	2	1	1	0	62
San Antonio	1	0	0	0	0	6	1	2	0	0	67
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	8
Great Falls	0	7	0	0	0	0	0	0	0	2	16
Helena	0	0	0	0	0	0	0	0	0	8	3
Missoula	0	0	0	1	0	0	0	0	0	0	10
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	0	4
Colorado:											
Denver	5	2	0	0	0	13	1	0	0	47	104
Pueblo	0	0	0	0	0	1	0	0	0	0	2
New Mexico:											
Albuquerque	0	0	0	1	0	1	0	0	0	0	8
Arizona:											
Phoenix	0	0	0	0	0	3	0	0	0	0	23
Utah:											
Salt Lake City	1	1	1	0	0	1	0	0	0	47	31
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	5
PACIFIC											
Washington:											
Seattle	3	3	0	2			1	2		14	
Spokane	1	0	1	8			0	0		11	
Tacoma	1	1	2	4	0	2	1	0	0	2	24
Oregon:											
Portland	1	2	6	4	0	3	0	1	0	0	79
Salem	0	0	0	0	0	0	0	0	0	3	
California:											
Los Angeles	13	8	4	4	0	19	2	3	1	23	249
Sacramento	1	3	0	0	0	3	0	0	0	1	22
San Francisco	6	6	0	0	0	10	1	2	0	1	162

City reports for week ended July 12, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	1	0	0	0	0	0	0	0
Massachusetts:									
Boston	0	0	0	0	0	0	1	1	0
Worcester	1	0	0	0	0	0	0	0	0
Connecticut:									
Pawtucket	1	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	2	1	0	0	0	0	0	2	0
New York [1]	7	2	2	1	0	0	6	1	0
Syracuse	0	0	0	0	0	0	0	4	0
New Jersey:									
Newark	3	1	1	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	3	2	1	1	0	0	0	1	0
Pittsburgh	0	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cleveland	3	1	0	0	0	0	0	0	0
Indiana:									
Indianapolis	1	2	0	0	0	0	0	0	0
Illinois:									
Chicago	2	0	0	0	0	0	1	1	0
Michigan:									
Detroit	6	0	0	0	0	0	1	0	0
Wisconsin:									
Milwaukee	0	0	1	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	0	0	0	0	0	0	0	0
Iowa:									
Waterloo	1	1	0	0	0	0	0	0	0
Missouri:									
St. Joseph	1	0	0	0	0	0	0	0	0
St. Louis	2	1	1	0	0	0	1	0	0
South Dakota:									
Sioux Falls	0	0	0	0	0	0	0	1	0
Kansas:									
Wichita	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	1	1	0	0	1	0	0
Virginia:									
Norfolk	0	1	0	0	0	0	0	0	0
West Virginia:									
Wheeling	0	0	0	0	0	0	0	1	1
North Carolina:									
Raleigh	0	0	0	0	2	2	0	0	0
Wilmington	0	1	0	0	2	0	0	0	0
Winston-Salem	1	0	0	0	4	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	3	0	0	0	0
Columbia	0	0	0	0	0	2	0	0	0
Georgia:									
Atlanta	0	0	0	0	1	1	0	0	0

[1] Typhus fever: 2 cases at New York City, N. Y.

City reports for week ended July 12, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	2	1	0	0	0	1	0	0	0
Nashville	2	3	0	0	0	1	0	0	0
Alabama:									
Birmingham	0	0	1	0	0	0	0	1	0
Mobile	0	0	0	0	0	1	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
New Orleans	0	0	0	0	9	4	0	0	0
Shreveport	0	0	0	0	0	3	0	1	1
Oklahoma:									
Tulsa	1	0	0	0	0	0	0	0	0
Texas:									
Dallas	0	0	0	1	5	4	0	0	0
Houston	0	0	0	0	0	2	0	0	0
MOUNTAIN									
Montana:									
Missoula	1	0	0	0	0	0	0	0	0
Colorado:									
Denver	0	0	0	1	0	0	0	0	0
Arizona:									
Phoenix	0	0	0	0	0	0	0	1	0
Utah:									
Salt Lake	3	1	0	0	0	0	0	0	0
PACIFIC									
Oregon:									
Salem	0	0	1	0	0	0	0	0	0
California:									
Los Angeles	2	2	0	0	0	0	1	40	0
San Francisco	1	1	0	0	1	0	1	3	0

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended July 12, 1930, compared with those for a like period ended July 13, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, June 8 to July 12, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929
98 cities	80	106	68	112	67	110	[2] 59	89	[3] 59	88
New England	35	79	35	74	62	94	51	70	38	79
Middle Atlantic	82	131	81	125	65	144	59	101	52	99
East North Central	129	145	93	165	98	131	91	128	[4] 88	119
West North Central	59	65	34	87	70	85	[5] 33	77	66	69
South Atlantic	40	64	33	64	24	34	[6] 24	34	29	43
East South Central	13	41	13	34	13	34	40	27	27	41
West South Central	86	84	86	65	37	69	52	72	[7] 65	84
Mountain	34	35	9	26	0	26	9	26	26	26
Pacific	43	34	54	58	64	84	38	43	61	41

MEASLES CASE RATES

	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929
98 cities	833	483	656	423	500	267	[2] 281	195	[3] 258	150
New England	1,415	337	1,048	391	762	211	498	209	421	186
Middle Atlantic	1,089	143	818	123	640	99	339	76	322	51
East North Central	457	1,152	381	1,010	334	620	170	474	[4] 156	351
West North Central	362	581	658	504	264	256	[5] 154	114	127	104
South Atlantic	362	242	375	129	234	137	[6] 175	73	130	49
East South Central	182	41	270	41	256	7	142	27	202	14
West South Central	101	209	82	183	19	156	26	69	[7] 19	61
Mountain	3,321	261	2,617	218	1,416	148	712	148	566	104
Pacific	1,564	384	1,247	352	931	208	527	138	562	152

SCARLET FEVER CASE RATES

	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929
98 cities	192	188	145	148	109	112	[2] 77	88	[3] 72	83
New England	199	204	115	159	124	119	66	90	66	83
Middle Atlantic	155	129	118	100	89	72	57	46	51	41
East North Central	304	322	229	260	184	191	116	173	[4] 114	160
West North Central	233	110	148	77	97	104	[5] 114	38	83	79
South Atlantic	145	133	97	73	62	62	[6] 55	60	62	64
East South Central	54	75	67	89	61	34	13	55	47	48
West South Central	37	107	105	88	41	42	49	23	[7] 38	42
Mountain	129	70	197	96	60	70	163	44	86	35
Pacific	113	251	85	210	57	164	45	135	50	89

SMALLPOX CASE RATES

	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929
98 cities	15	16	10	9	13	15	[2] 7	15	[3] 7	8
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	11	28	8	18	10	38	5	41	[4] 9	19
West North Central	53	12	30	6	51	19	[5] 13	13	9	15
South Atlantic	7	4	2	6	9	2	[6] 2	2	0	2
East South Atlantic	40	55	20	0	7	7	20	21	20	7
West South Central	22	42	26	4	22	4	0	11	[7] 8	15
Mountain	34	44	34	61	51	113	51	35	9	35
Pacific	57	46	43	31	50	14	38	24	43	10

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1930, and 1929, respectively.
[2] Kansas City, Mo., Atlanta and Brunswick, Ga., not included.
[3] South Bend, Ind., and Fort Smith, Ark., not included.
[4] Sooth Bend, Ind., not included.
[5] Kansas City, Mo., not included.
[6] Atlanta and Brunswick, Ga., not included.
[7] Fort Smith, Ark., not included.

Summary of weekly reports from cities, June 8 to July 12, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929— Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929
98 cities	9	9	8	8	13	12	[2] 10	10	[3] 16	14
New England	9	11	0	4	9	9	7	4	4	4
Middle Atlantic	8	3	4	2	5	7	6	6	10	7
East North Central	4	4	3	4	10	3	1	4	[4] 6	7
West North Central	6	17	8	19	13	15	[5] 7	13	9	10
South Atlantic	15	11	22	13	37	30	[6] 28	32	55	7
East South Central	27	34	54	55	67	34	94	48	94	157
West South Central	19	19	26	34	34	34	49	8	[7] 38	84
Mountain	9	9	9	9	34	52	0	17	0	9
Pacific	19	19	7	5	5	19	5	7	17	2

INFLUENZA DEATH RATES

	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929
91 cities	6	6	4	6	3	5	[2] 4	2	[4] 4	3
New England	2	7	2	2	0	2	2	0	0	2
Middle Atlantic	5	4	5	3	2	4	4	3	4	2
East North Central	6	8	4	8	3	4	2	1	[4] 3	3
West North Central	15	9	0	6	0	0	[5] 0	0	6	0
South Atlantic	2	2	2	6	5	4	[6] 4	2	2	4
East South Central	15	7	15	15	15	15	7	15	15	7
West South Central	27	12	8	16	11	4	15	4	8	4
Mountain	0	0	0	0	0	44	0	0	0	26
Pacific	6	6	0	6	3	3	9	0	3	0

PNEUMONIA DEATH RATES

	June 14, 1930	June 15, 1929	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929
91 cities	85	86	74	81	68	64	[2] 55	63	[4] 54	55
New England	82	85	69	56	49	58	29	49	40	29
Middle Atlantic	101	98	82	89	75	65	58	67	57	62
East North Central	67	82	53	76	56	69	41	56	[4] 37	50
West North Central	77	54	109	48	86	48	[5] 62	63	74	51
South Atlantic	73	88	64	84	66	62	[6] 51	69	55	58
East South Central	110	104	133	119	103	75	162	75	81	30
West South Central	107	62	69	82	92	66	84	109	84	82
Mountain	86	113	129	78	77	104	60	61	103	44
Pacific	71	60	74	104	55	38	64	31	61	53

[2] Kansas City, Mo., Atlanta and Brunswick, Ga., not included.
[3] South Bend, Ind., and Fort Smith, Ark., not included.
[4] South Bend, Ind., not included.
[5] Kansas City, Mo., not included.
[6] Atlanta and Brunswick, Ga., not included.
[7] Fort Smith, Ark., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Weeks ended July 5 and July 12, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the weeks ended July 5 and July 12, 1930, as follows:

Week ended July 5, 1930

Provinces	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia						1
New Brunswick						3
Quebec				1		8
Ontario	1		2	3	3	6
Manitoba [1]						
Saskatchewan						1
Alberta [1]						
British Columbia					2	
Total	1		2	4	5	19

Week ended July 12, 1930

Provinces	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia			2			1
New Brunswick						4
Quebec	3					13
Ontario	2		1	1	5	16
Manitoba						1
Saskatchewan					2	
Alberta	1				2	1
British Columbia		1			2	2
Total	6	1	3	1	11	38

[1] No case of any disease included in the table was reported during the week.

Quebec—Communicable diseases—Week ended July 12, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended July 12, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	3	Mumps	15
Chicken pox	20	Ophthalmia neonatorum	1
Diphtheria	39	Scarlet fever	45
Erysipelas	3	Tuberculosis	66
German measles	5	Typhoid fever	13
Influenza	1	Whooping cough	24
Measles	40		

CUBA

Provinces—Communicable diseases—Four weeks ended July 5, 1930.—During the four weeks ended July 5, 1930, cases of certain communicable diseases were reported in Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1	3				1	5
Chicken pox	20	10		5		1	36
Diphtheria	1	9		2	2	5	19
Malaria		17		1	11	51	80
Measles		15		1			16
Paratyphoid fever	1	1	5	1	1	7	16
Scarlet fever	1	9	1				11
Tetanus (infantile)						1	1
Typhoid fever	3	39	7	54	22	25	150

JAMAICA

Communicable diseases—Four weeks ended June 21, 1930.—During the four weeks ended June 21, 1930, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica, outside of Kingston, as follows:

Disease	Cases		Disease	Cases	
	Kingston	Other localities		Kingston	Other localities
Cerebrospinal meningitis		2	Puerperal fever		6
Chicken pox	2	11	Scarlet fever	1	3
Diphtheria		2	Smallpox (alastrim)		2
Dysentery		3	Tuberculosis	32	49
Paratyphoid fever		1	Typhoid fever	22	75

PORTO RICO

San Juan—Communicable diseases—Five weeks ended July 5, 1930.—During the five weeks ended July 5, 1930, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	1	Tetanus	1
Dysentery	1	Tuberculosis	57
Malaria	6	Typhoid fever	4

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930			May, 1930					June, 1930				July, 1930		
					12	19	26	3	10	17	24	31	7	14	21	28	5	12	19
Afghanistan	C																	[1] P	
China:																			
Canton	C									1	1	1		2				2	
Manchuria—Dairen	C		1																
Swatow	C											3	4	3					
India	C	6,461	5,914	10,817	4,947	7,436	15,870	13,209	15,596	14,600	12,468								
	D	3,606	3,371	5,866	2,924	4,345	10,403	10,234	12,782	11,882	9,756								
Bassein	C				3	1	1	2	3	4									
	D				2	1	1	1	3	2									
Bombay	C			4															
Calcutta	C	202	269	334	137	165	165	180	194	175	142	98	78	73	94	77	81		
	D	110	153	220	85	118	118	93	125	107	83	57	44	36	36	63	54		
Negapatam	C	12												1					
	D	4												1					
Rangoon	C	3	3	2				1		5	2	2	1	1	2	2	1		
	D	3	1	2				1		1		2	1	1	1	1	1		
Tuticorin	C	3																	
	D	1																	
India (French):																			
Chandernagor	C		4	1	1	2		3	2	2	2					2			
	D		2	3			4	1	1	4	1					1			
Karikal	C		4	12		1													
	D		1	9		1													
Indo-China (see also table below):																			
Pnompenh	C	11	9				2		1				5	10	11	14	9		
	D	8	7	6						2	2	1	1	4	7	6	6		
Saigon and Cholon	C	2	5	14	17	12	19	28	59	40	48	13	17	19	7	5	7		
	D	2	4	6	10	10	13	22	43	27	24	7	11	10	2		3		

Philippine Islands:																			
Bulacan Province—																			
Malolos	C												1			1			
	D												1						
Santa Maria	C															1			
Cebu Province—																			
Bantayan	C												3	10	86	86	134	94	67
	D												3	9	39	43	8	41	36
Barili	C															1	1		
	D																1		
Bogo	C													1	3	1	23	21	6
	D													1	1	1	11	9	4
Cebu	C															20	14	13	13
	D															9	6	7	12
Madridejos	C															15	13	3	1
	D															8	5	1	1
Medellin	C															1	18	38	6
	D																6	9	3
Opon	C																		• 11
	D																		1
San Remigio	C														3	8	38	23	12
	D														2	4	8	5	2
Sante Fe	C												1						
	D												1						
Tobogon	C																	13	1
	D																	6	2
Iloilo Province—																			
Akuy	C																		9
	D																		4
Concepcion	C																		1
Iloilo port	C																	1	11
	D																		9
Jaro	C																		4
	D																		3
La Paz	C																	2	7
	D																	3	5
Lumbeno	C																		1
	D																		1
Miagao	C															1	1		17
	D																2		11
Paist	C																		1
Pavia	C																		1
San Miguel	C																		24
	D																		19
Santa Barbara	C																		1
	D																		1
Tigbauan	C																		1
	D																		1
La Union Province—Rosario	C																	1	
Leyte Province—Maripipi	C													1	15	20			
	D														11	9			

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930 12	April, 1930 19	April, 1930 26	May, 1930 3	May, 1930 10	May, 1930 17	May, 1930 24	May, 1930 31	June, 1930 7	June, 1930 14	June, 1930 21	June, 1930 28	July, 1930 5	July, 1930 12	July, 1930 19
Philippine Islands—Continued																			
Manila	C										1								
Masbate Province—																			
Catbabayn	C																	4	
	D																	1	
Cataingan	C															10	20	21	8
	D															3	4	14	2
Misami Province—San Miguel	C																	2	
	D																	2	
Negros—																			
Bacolod	C														9			4	13
	D														8			4	9
Bago	C																		2
	D																		1
Binalbagan	C																	9	11
	D																	3	3
Cadiz	C											10	2	10	10	3	3	1	7
	D											7	1	3	5	3	4	1	5
Escalante	C												1					22	12
	D												1					7	10
Calatrava	C														3			1	
	D														2			1	
Cauyan	C																		1
	D																		1
Guiyhulgan	C																		6
	D																		3
Hinigaran	C																		16
	D																		11
Isabela	C																	11	13
La Carlota	C															3	1		2
	D															1	1		1
La Castellana	C															4	3	5	6
	D															2	3	3	3
Manapla	C																		3
	D																		2
Mariagla	C																		1
	D																		1
Murcia	C																		1
	D																	3	

Pinamalayan	C																		16
	D																		13
Polupandan	C																	1	
	D																	1	
Pontevada	C																	7	13
	D																	3	14
Puludan	C																	1	3
	D																	1	3
Sagay	C																		10
	D																1		6
San Carlos	C																	6	5
	D																	3	1
San Enrique	C																	5	19
	D																	3	12
Saravia	D																		4
Silay	C																	6	11
	D																	6	10
Talisay	C														7	4		6	11
	D														7	1		4	7
Valladolid	C																	3	13
	D																	4	12
Villa Hermosa	D																	1	
Pampanga Province—																			
Angeles	C															1			
Bacolor	C															1			
Lubao	C																2		
Pangasinan Province—																			
Binmaley	C																2		
Urdantea	C																		1
Rizal Province—Navotas	C											1							
	D											1							
San Antonio	C													1					
	D													1					
Siam	C	3	7	1	8	7	6	8	12	4	6	4		1	6				
	D		4		6	3	2	2	10	2	2	2		1	4				
Bangkok	C	3	2	2	1	5	4	5			6	3	5	3	3	1			
	D			1	1	2	1				2	1		3		2			
Nagara Pathom	C		1				4	6											
	D		1				2												
Songkld	C																	8	
	D																	4	
On vessel:																			
S. S. at Suva, Fiji Islands	C		1																
S. S. Sutley, at Batavia, from Calcutta	C		1																
S. S. Sassari, at Massoua, from Jeddah	C											1							
	D											1							
On small boat at Port Cebu, from Bantayan Island	C												1						
	D												1						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19
Algeria:																			
Algiers	C																1	1	
Constantine	C												1					1	
Argentina:																			
Andalgala.[1]																			
Rosario	C	P																	
Santa Fe	C	6																	
Villa Lia	D		2																
Azores: Ponta Delgada	C					1	7												
	D						5												
Belgian Congo	C																2		
	D																2		
Brazil:																			
Rio de Janeiro	C	1																	
	D	1																	
Sao Paulo.[2]																			
British East Africa (see also table below):																			
Tanganyika	C		7			11	33												
	D					10	10												
Uganda	C	82	47	98	27	20	23	47	54	89									
	D	70	43	87	27	19	21	38	48	75									
Ceylon:																			
Colombo	C	4	3	4			1		4	1		1	1					1	
	D	4	3	4			1		3	1		1	1					1	
Plague-infected rats		1	3	2	2			2					1						
Chile: Antofagasta	C	1	1	1				1											
	D			2				1											
Dutch East Indies:																			
Batavia and West Java	C	167	153	124	27	16	20	24	18	33	17								
	D	164	150	122	27	16	20	24	18	33	17								
Plague-infected rats		3	3	3		6	2				3	2	3	1					
Celebes—Makassar	C	1																	
	D	1																	
Java and Madura	D	317	296	223	59	40	35	48	28	74	36								
Ecuador (see table below).																			

Egypt:																			
Alexandria	C	4	1	4			1	1	2	3	3	5	3	6	6	4	8	8	3
	D	1		1			1	1			1	2	2		2	5	2	3	2
Assiout	C						7	7	3	9	2	6	4	2	3		1	1	
	D						3	2		3	1	1		1		2			
Beheira	C	2		4															
Beni Suef	C			4															
Dakahlieh	C		8	5	2		1	2	3	1	2	5	1						
	D			1						1	1								
Gharbieh	C	1					1												
	D						1												
Girga	C				1														
Minieh	C										6	1	1	1	4	4	2	1	
	D											1		1					
Port Said	C				1					1	1		1			1			
France: St. Ouen	C																		1
	D																		1
Greece (see also table below):																			
Patras	C			1											1				
Piraeus	C	1																	
Pyrgos	C			1															
Hawaii Territory, Hamaqua, Hawaii: Plague-infected rats															1				
India	C	4,814	5,639	4,087	917	343	535	420	281	188	117								
	D	3,308	3,940	3,344	753	229	517	461	271	205	103								
Bassein	C	1		3															
	D	1		1															
Bombay	C	1	1	7		4			4	1		1	1		2				
	D	1	1	5	1	3	4		1	4					1	1			
Plague-infected rats		28	31	86	20	28	25	35	23	39		19	6	7	8	5	13		
Madras Presidency	C	27	230	157	12	15	9	8	2		6	30	2		2				
	D	13	140	87	6	8	4	1		1	4	6							
Rangoon	C	3	7	3		3		2		1	3					1			
	D	2	6	3		2	1	1	1	1	1					1			
Plague-infected rats		1	7	3	1	2		1	1	3	1				1		2		
India (Portuguese)	D								7										
Indo-China (see also table below):																			
Pnompenh	C	1			2			1	1			2	6						
	D	2	13	13	2	1	1				1		5	1		1			
Saigon and Cholon	C	2		1					1				1		1				
	D	2		1															
Iraq: Baghdad	C	6	6	7		2		4	7	11	7	12	12	4	8	4	10	4	2
	D	2	1	4				2	3	5	4	6	7	3	5		5		1
Japan: Osaka (vicinity of)—Plague-infected rats		7	6	4	1	1	1												
Kwang-Chow-Wan	C	25	25	7				37		20		14	23		8				
Madagascar (see also table below): Tamatave	C					1							1						
Morocco	C	4	48	55	14	41	34	32	19	22	18	12	2		1				
	D		13	18	6	26	12	11	11	14	6	3	4						

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.

[2] 21 cases of plague with 8 deaths reported Jan. 29, 1930, in the State of Sao Paulo, Brazil; 15 of these cases were in the city of Sao Paulo.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19
Nigeria: Lagos	C	6	7	13					1	1			1		3	1			
	D	6	7	5					1	1			1		3	1			
Plague-infected rats		44	42	25	3	3	1		2	6	5	4	1						
Senegal (see table below).																			
Siam	C	8	17	16	4		1			1	1	3							
	D	6	13	15	4		2			1		3							
Bangkok	C		1	5						1	1	3							
	D		1	4						1		3							
Nagara Pathom	C	7	5	1	'4	3	2	1											
	D	7	6	1	4	3	1	1											
Nagara Rajsima	C	2	2	1		1													
	D			1		1													
Syria: Beirut	C													2	1	1		2	4
Tunisia:																			
Sfax district	C	18	22				1		17			4	6		3				
Tunis	C	6	5	1				4				1		1				1	
	D												1					1	
Union of Socialist Soviet Republics:																			
Saisk Region	C												1			1			
	D												1						
Stabropol Region	C												1						
	D												1						
Union of South Africa:																			
Cape Province	C	1	2	1					P				1						4
	D		1	1															
Orange Free State	C	15	11	5	1														
	D	9	3	3															
Transvaal	C	8	2	1															
	D	3		1															
On vessel:																			
At Rio de Janeiro, Brazil, from Argentina	C	1																	

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
British East Africa (see also table above):							
Kenya	C	34					
Uganda	C	184	109				
	D	155	90				
Ecuador: Guayaquil	C	4	2	2	0		
	D	2	2		0		
Plague-infected rats		4	2	2	0		
Ecuador (outside of Guayaquil)	C	4					
	D	2					
Greece (see also table above)	C				1		1
Indo-China (see also table above)	C	10	30	27	4		11
Madagascar (see also table above)	C	282					
	D	258					
Ambositra Province	C	128	49	25	14		
	D	111	41	20	12		
Antsirabe Province	C	26	22	38	46		
	D	25	22	36	45		
Itasy Province	C	31		4			
	D	31		4			
Miarinarivo Province	C		25	14	1		
	D		25	14	1		
Madagascar (see also table above)—Con.							
Moramanga Province	C	22	7	5	3		
	D	21	4	5	3		
Tamatave Province	C	3					
	D	1					
Tananarive Province	C	88	110	52	39		
	D	83	107	52	38		
Senegal:							
Baol [1]	C			18	24	13	
	D			8	12	11	
Dakar [1]	C				2	52	
	D				2	42	
Louga [1]	C		2		33	54	
	D				10	27	
Thies [1]	C	3		3	12	21	
	D			2	9	8	
Tivaouane [1]	C	1		11	71	135	
	D			8	38	69	

[1] Incomplete reports.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19
Algeria:																			
Algiers	C	6	1	5	1					1		2							
Constantine	C	1													1				
Oran	C	5		1															
Arabia: Aden	C	1	2	3			1										1		
Bolivia: La Paz.[1]																			
Belgian Congo (see table below).																			
British Borneo: Sarawak	C	4	19																
British East Africa (see also table below):																			
Tanganyika	C	5	49	103			26	31	33	45	55	276							
	D		8	7			10	4	3	5	8	54							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930 12	19	26	May, 1930 3	10	17	24	31	June, 1930 7	14	21	28	July, 1930 5	12	19
British South Africa:																			
Northern Rhodesia	C			9				1											
	D							2											
Southern Rhodesia	C	1	6				66		53		42	60	75						
	D						1		4		8	1							
Canada:																			
Alberta	C	22	4	10	3	1												2	
Edmonton	C	19	1	4	3														
British Columbia—Vancouver	C	16	16	20	8	1	5	3			2	2	1	1			2	2	
Manitoba	C	6	2	4	2			2			7	3			4				
Ontario	C	63	86	100	17	30	18	12	14	24	24	20	14	10	13	10	3	5	
Fort William	C	4																	
North Bay	C	2	1						1										
Ottawa	C	10	11	19	8	4	7	2	3	10	7	5	6		8	1	1	1	4
Toronto	C	2									3	1	2	1	1			1	
Quebec	C	11																	
Montreal	C	1														4	3		
Saskatchewan	C	86	76	47	3	10	7	21	20	6	10	3		12	10			2	
Regina	C								1		3								
Ceylon:																			
Angoda, Western Province	C		10					6											
	D		1					2											
Colombo	C	1	3																
	D		2																
China:																			
Canton	C	7	11	6		2	1						1						
	D	2	3	2	1	1		1											
Chungking	C	P	P		P	P	P	P	P		P	P	P						
Foochow	C	P	P			P		P		P		P							
Hong Kong	C	118	62	38	20	7		1	5	5	2		2	1	1				
	D	109	51	25	11	9	3		4	2	3		1		1	1			
Manchuria—																			
Harbin	C	3				1				10	10								
Kwantung—Dairen	C	6	5			1		1	1		7			11	5		8		
	D										4				1				
Nanking	C	P	P	P	P			P	P			P	P	P					
Shanghai—																			
Foreigners only	C	5	2	2	2	1				1	1		1	1	1	2	1		
Including natives	D	8	7	10	4	3	2	1		1	2	2	1		1	1			

Swatow	D	3	6	6	2			1	1		1	4	1		1	2			
Tientsin	C	1	1	2	1			1	1										
Chosen (see table below).																			
Colombia:																			
Baranquilla	C		102	2	1														
Buenaventura	C		1		7	5	2	1	2		1	1	1	1					
Costa Rica:																			
Port Limon	C				1	1	2	2				2	2						
San Jose [2]	C			10	7														
Curacao (alastrim)	C			14			1	1	2					1					
Dahomey (see table below).																			
Dutch East Indies:																			
Borneo	C	1		185	17	43	20	10		10	4								
	D	1		12	16	12	2	1	1										
Java—																			
Batavia and West Java	C	14	14	78	30	25	8	1	1		5	1		1			3		
	D	7	7	6	6	1	3	1	1		3	2		1			2		
East Java and Madura	C						4												
Sanggi Islands	C	25	12	5		43	51	66	14	12									
	D			1		2	9	13	1	4									
Sumatra	C	2		48															
	D			5															
Egypt: Port Said	C	2			1					1									
Great Britain:																			
England and Wales	C	1,455	1,530	1,700	423	345	353	306	462	324	304	327	237	266	241	182	156		
Ashton under Lyne	C	4	29	15	9	3	4	2	6	3	4	4			3	4			
Bradford	C	5	2		1			2		1		1							
Cardiff	C			2	1	2											2		
Leeds	C	6	11	16	1	1											1		
London	C	597	699	710	169	169	129	137	222	138	148	129	130	136	125	107	84		
London and Great Towns	C	1,101	1,156	1,239	308	264	265	229	339	250	235	254	197	208	190	158	127		
	D	2	5	3	2	1	1												
Sheffield	C			8	1	1													
Stoke-on-Trent	C	12	41	122	17	23	33	12	19	9	13	21	3	10	15	4	3		
Scotland	C												1		3				
Hedjaz	C	11																	
India	C	26,524	36,036	39,329	10,319	7,786	[illegible]	8,353	6,533	6,549	5,416								
	D	6,186	7,710	9,109	2,064	1,543	1,779	1,597	1,449	1,814	1,196								
Bombay	C	342	638	718	143	114	89	84	52	68	58	40	36	35	23	19	17		
	D	164	314	431	88	78	64	44	33	49	44	35	27	23	19	10	13		
Calcutta	C	185	399	361	153	116	122		109	70	52	71	56	45	45	25	27		
	D	130	287	305	124	97	103		94	72	40	52	50	37	29	30	17		
Cochin	C	234	184	291	56	49	58	20	13	8	7	9	4	1	10	1			
	D	27	29	35	3	4	6	2	5	1	2		2	1	1				
Karachi	C	30	38	33	10	9	7	4		6	7	1	5		1	1			
	D	9	16	47	10	3	2	2	2		1	1	2		1				
Madras	C	105	159	173	55	26	27	25	24	13	15	20	9	10	8	8	6		
	D	16	29	36	6	6	5	10	4	5	6		6	3	1		4		
Moulmein	C	65	143	146	10		33		27	29	20	13		9	6	6	4		
	D	18	40	41	4		3		4	6	5	6		3	3	1	3		

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930 12	April, 1930 19	April, 1930 26	May, 1930 3	May, 1930 10	May, 1930 17	May, 1930 24	May, 1930 31	June, 1930 7	June, 1930 14	June, 1930 21	June, 1930 28	July, 1930 5	July, 1930 12	July, 1930 19
India—Continued.																			
Negapatam	C		1								1			1		1			
Rangoon	C	7	7	10		1	1	2	2		3	1	1	5	1	2	2		
	D	4	2	5					1						1	1			
Tuticorin	C	3									5				1				
Vizagapatam	C	5	9	69	1		2	3	3	1	1			1					
	D		1	18	1			1		3									
India (French):																			
Chandernagor	C	3	11	6	4		6		6	2	8	8	4	8					
	D		5	2			2		2	4	1								
Karikal	C	3	12	24	8	9	2		6	5	1		4	3					
	D	3	8	7	3	3	2		2	1			2	2					
Pondicherry Province	C	22	52	21	12	1	11		9	13	10	8	4	4					
	D	19	40	13	11	1	8		7	12	10	7	4	4					
India (Portuguese)	C	16	50	38	5	6	15	17	2	27	5	13							
	D		6	2			5	3		3	1	4							
Indo-China (see also table below):																			
Pnompenh	C								1		1	1							
	D	1				1	1						1						
Saigon and Cholon	C	3	4	3			4	1	1	1		1	1						
	D	3	2	1		1	3	1		1		1							
Iraq:																			
Baghdad	C	7	3		1	2	3	2	1				1				1		
	D	3	1					1	1										
Basra	C		1					1											
Mossul Liwa	C	26	12			22			13		8			1		3	47	20	
	D	7	2			3			2		1			1			19	1	
Ivory Coast (see table below).																			
Jamaica (alastrim)	C											2							
Japan: Tokyo	C							1											
	D							1											
Macao	D		2	3	1			1	1										
Mexico (see also table below):																			
Jalisco (State): Guadalajara	D	9	14	22	6	4	8	2			6	1	4		5	6	3	1	
Juarez	C	2	3	2											6				
	D	1	1												1				
Mexico City and surrounding territory [3]	C	30	38	106	36	19	20	24	30	15	17	18	17	23	20				
	D	7	21	31	14	8	14	11	6	12	8	6	5	4	3				
Morelos State: [4]																			

Progreso	C										1								
	D										1				1				
San Luis Potosi	C		1																
	D		1																
Morocco (see table below).																			
Nigeria (see also table below): **Lagos**	C	5	2	1	1											1			
	D	2																	
Persia (see table below):																			
Philippine Islands: Sarangani and Balut Islands [5]	D	18	3																
Poland	C		2				2	5		1		2							
Portugal: Lisbon	C	4	7	7	2	3	3		6		2		1		2	7			
Rumania	C	1	1	2															
Siam	C		2		2	2	2	2	2										
	D	1				2	2												
Somaliland, British: Boales	C	35	19	2															
	D	8	2	6															
Spain	C													4		8			
Straits Settlements	C	2		5	2	1		2	1	3	2	5	5		1	3	1		
	D	1		1	1			1		1	1	1	1		1		1		
Sudan (Anglo-Egyptian)	C	230	79	60	2	9	31			5	13	1	4	8	1	54	8	1	
	D	34	6	5	1		3				1	1				3		1	
Sudan (French) (see table below).																			
Syria (see table below).																			
Taiwan: Taihoku (see table below).																			
Tunisia: Tunis	C	7	3	3			1	2		1		1			2				
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P		P		P	P	P	P							
Orange Free State	C	P	P	P															
Transvaal	C	P	P	P															
Upper Volta	C		26	2	2		1					1				5			
Zanzibar	C			13															
On vessel:																			
S. S. Tairoa, at Liverpool, from London	C		1																
S. S. Karagola, at Zanzibar, from India	C	4																	
S. S. Karagola, at Lourenco Marques, from India	C		1																
S. S. Elysia, at Port Sudan, from Bombay	C					1													
S. S. Naldera, at Port Said	C								1										
S. S. Manoa, from Honolulu to San Francisco	C															1			

[3] During the month of March, 1930, 100 cases of smallpox were reported in Mexico City, Mexico, and surrounding territory.
[4] Newspaper reports of Feb. 4 show an epidemic of smallpox in Iouacatepec, Morelos State, Mexico, and vicinity, giving 600 deaths in preceding 2 weeks.
[5] On Feb. 1, 1930, 317 cases of smallpox with 102 deaths were reported to that date in the Sarangani and Balut Islands.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		December, 1929	January, 1930	February, 1930	March, 1930			April, 1930			May, 1930			June, 1930	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Belgian Congo	C	74													
	D	4													
Dahomey	C	19													
Indo-China (see also table above)	C	142	460	434			26	261				173	132	80	133
Ivory Coast	C					7									
Sudan (French)	C	17	229	213		200	409	371		150	40	56	178	76	
	D		25	11		18	31	30		6	7	7	18	18	
Syria: Beirut	C	25	70	18	4	8	5	10	2	7				6	1
Taiwan: Taihoku	C			43	31	12	15	10	2						

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
British East Africa (see also table above):							
Kenya	C	168	12	12	175	174	
Uganda	C		184	109			78
	D		155	99			69
Chosen	C		1	4		5	
	D			1		1	
France	C	9	9	23	8		3
Mexico: Durango (see also table above)	D	4	12	6	5	4	4
Morocco	C	84	29	74		10	18
Nigeria	C	293					
	D	70					
Persia	C	P					
Turkey	C	883	215	114		3	16
	D	457	66	42			

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 12-Feb. 8, 1930	Feb. 9-Mar. 8, 1930	Mar. 9-Apr. 5, 1930	Week ended— April, 1930			May, 1930					June, 1930				July, 1930	
					12	19	26	3	10	17	24	31	7	14	21	28	5	12
Algeria:																		
Algiers	C	3	4	6	2	3	2	1	1	2	4	8	2		1			
Constantine Department	C	4	5	11	4	9	2			4		2	11		1			
Oran	C	2										3				4		
Arabia: Aden	C			1														
	D			1														

Bolivia: La Paz.[1]																		
Brazil: Porto Alegre	C		2						1									
Bulgaria	C		13	9	15				1		5		1		9	6		
	D		1		1				1		1		1					
Sofia	C	1																
Chile:																		
Talcahuano	D	1																
Valparaiso	C	1																
China:																		
Manchuria—Harbin	C		1	4	5		20	27										
Shanghai	C			1														
Tientsin	C	1																
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C						1								1		1	
Beheira Province	C	14	18	2			2		9	21	9	10	17	16	7	5		5
	D		5						4	4	4	1	1	1		2		1
Cairo	C		1															
Port Said	C	2	1															
Suez	C	1																
Great Britain: Scotland—Glasgow	C									1								
	D									1								
Greece (see table below).																		
Iraq: Baghdad Liwa	C			2														
Ireland:																		
Irish Free State—																		
Ballina—Mayo County	C											2		1				
Dingle—Kerry County	C						3	2										
Mohill—Leitrim County	C															9		
Shillelagh—Wicklow County	C													1		3	1	
Swinford—Mayo County	C									7	7							
Northern Ireland—Cookstown	C		3															
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico: Mexico City, including municipalities in Federal District	C	12	9	4	2	1		1		2		4	2	3	1			
	D	4		1	2	1		1				3		1				
Morocco	C	23	21	38	6	5	3	1	3	6	1	1	1		6	8		
	D			7	2	1												
Palestine	C		1	6		1				2			2				3	1
Poland	C	296	183	228	59	64	53	67	64	45	34	28			26	37		
	D	21	8	13	4	2	3	6	2	2		1			2	3		
Portugal:																		
Lisbon	C							4										
Oporto	C		1	2	1													
Rumania	C	241	293	185	71	46		69	60	58								
	D	25	23	12	1	9		1	10	11								
Spain: Valencia	C													2		1		
Tunisia	C		3						2	2	1	1			2	16		
Turkey (see table below).																		

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	19	26	May, 1930: 3	10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	-----	-----	P	P	P	P	-----	-----	-----	-----	P	-----
Natal	C	1	3	P	P	P	P	-----	P	P	-----	P	-----	-----	-----	-----	P	-----
Orange Free State	C	P	P	P	-----	-----	-----	-----	P	P	P	P	-----	-----	-----	-----	P	-----
Transvaal	C	-----	-----	-----	P	P	P	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Yugoslavia (see table below).																		

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
Chosen: Seoul	C	1	-----	17	-----	3	-----	Lithuania	C	5	2	70	62	73	27
Czechoslovakia	C	-----	10	2	42	29	-----		D	1	-----	5	4	4	-----
France	C	1	-----	-----	-----	-----	-----	Turkey	C	4	2	3	1	3	16
Greece: Athens	C	6	12	6	3	1	3	Yugoslavia	C	6	26	33	46	22	16
Latvia	C	2	18	-----	-----	-----	-----		D	1	3	5	2	4	1

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast: July 10, 1930	1
Liberia, Monrovia, June 3, 1930	1

X

UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

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SPECIAL ARTICLES

Status of Scarlet Fever Streptococcus Products

Acute Response of Guinea Pigs to Ethylene Oxide

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GOVERNMENT PRINTING OFFICE
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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

VOL. 45 AUGUST 8, 1930 NO. 32

THE PRESENT STATUS OF STREPTOCOCCUS BIOLOGIC PRODUCTS IN THE PREVENTION AND TREATMENT OF SCARLET FEVER[1]

By M. V. VELDEE, *Surgeon, United States Public Health Service*

The use of scarlet-fever streptococcus toxin and scarlet-fever streptococcus antitoxin for the prevention and treatment of scarlet fever was discussed before this conference in 1926. It was the opinion of the members taking part in the discussion that—

1. The intradermal reaction to scarlet-fever streptococcus toxin is a fairly dependable measure of the susceptibility of the individual tested.
2. The majority of the individuals giving a positive reaction can be effectively immunized by the proper use of scarlet-fever streptococcus toxin.
3. The use of scarlet-fever streptococcus antitoxin, either for passive immunization or for the treatment of the individual ill with scarlet fever, is not yet founded on sufficient clinical data to permit a mature opinion as to the efficacy of this form of treatment.

The results of a vast amount of research work have been reported on since the 1926 conference, yet there seems to be little reason to alter the opinions just mentioned. No new and definite work which has direct application to the problems confronting the health officer has appeared. The accumulated data, however, have served to crystallize our opinions and to clarify the atmosphere somewhat.

Kirkbride and Wheeler (1) have isolated potent toxin-producing hemolytic streptococci from patients as late as six months after the onset of the disease. These toxins were neutralized by anti-streptococcus goat serum which had been produced with the Dochez NY-5 strain of streptococcus. Tunnicliff and Crooks (2) report on a hospital outbreak of scarlet fever. They feel that 14 cases of scarlet fever were derived from 3 healthy persons from whom hemolytic streptococci were isolated, the opsonic index method being used for the identification of the organisms. Moriwaki (3) found healthy carriers of hemolytic streptococci in 11 households in which there were

[1] Presented at the Twenty-eighth Annual Conference of State and Territorial Health Officers with the United States Public Health Service, Washington, D. C., June 18, 1930 (held jointly with the Forty-fifth Annual Conference of State and Provincial Health Authorities of North America).

cases of scarlet fever. In 10 instances the indications were that the scarlet-fever cases resulted from contact with healthy carriers. The findings of these and many other workers indicate that hemolytic streptococci may be isolated from the throats of persons ill with scarlet fever, from persons who have recently recovered from an attack of scarlet fever, from healthy persons who have had contact with those known to harbor the organism, and often from the throats of persons whose history gives no indication of association with scarlet fever. However, the mere isolation of a hemolytic streptococcus is not proof positive of its relationship to scarlet fever. The hemolytic streptococcus group is a very large one. The specificity and constancy of its individual members have not been fully established. In fact, the limits of specificity of the hemolytic streptococcus associated with scarlet fever are uncertain. A heated controversy is raging on this very subject. Equally good workers are to be found on either side of the question. The discovery of a hemolytic streptococcus in the throat of a well person can not be used to any practical or workable advantage by the health officer until these more or less academic controversies have been settled, and until there is made available to the diagnostic laboratory a method of identification which is both sure and relatively simple in its technique.

The subcutaneous injection into Dick-positive individuals of sufficient quantities of scarlet-fever streptococcus toxin will change the skin reaction from positive to negative in a very large percentage of those injected. Most workers report that 90 to 100 per cent of the reacting individuals will change from positive to negative. What influence such treatment has on the prevalence of scarlet fever in a large community can not be stated with certainty at the present time. The writer is not aware that it has been tried anywhere in this country so as to include a sufficiently large and representative population. Toyoda (4) and his colleagues, working in the city of Dairen, Manchuria, have recently presented some very interesting statistics. With regard to the prevalence of scarlet fever for the period of their reported observations the authors state that "within this span of time the worst epidemic of scarlet fever yet known about Dairen occurred." The prophylactic immunization of all of the Japanese primary-school children was completed in 1927. The scarlet-fever morbidity rates among the Japanese citizens of Dairen, the primary-school children excluded, were as follows:

Year	Population	Cases of scarlet fever	Attack rate per 1,000
1925	60,962	191	2.73
1926	71,122	629	8.85
1927	73,353	317	4.33
1928	77,455	262	3.38

At the same time the rates for the Japanese primary-school children were:

Year	Primary-school population	Cases of scarlet fever	Attack rate per 1,000
1925	8,623	100	11.6
1926	8,971	152	16.9
1927	9,788	114	11.6
1928	10,489	41	3.9

The data indicate that scarlet fever was equally prevalent during each of the four years; yet in 1928, the first year following complete immunization of the primary-school population, the morbidity rate in this latter group fell to 3.9 as compared to rates of over 10 per 1,000 for each of the three preceding years. The same authors quote Ozaki of the South Manchuria Railway Co., who is reporting on the Japanese primary-school children living under the jurisdiction of the railway company. Ozaki reports as follows:

Grouping of children according to skin reactions	Number in each group	Attack rate per 1,000
Not Dick tested and not immunized	1,849	23.8
Dick tested; found negative and not immunized	1,495	1.3
Dick tested; found positive but not immunized	47	106.4
Dick tested; found positive and completely immunized	1,112	2.6

Kiefer (5) and others have reported on the disappearance of scarlet fever from institutions in which there has been active immunization of those inmates showing a positive Dick test. While the presumption is strong that such immunization did eliminate institutional scarlet fever, yet the small number of individuals usually involved and the low prevalence in the community at large leave some possibility for the play of chance. The Dicks (6) report no cases of scarlet fever among 1,191 susceptible nurses and internes who had been immunized before they began work in hospitals for patients with contagious diseases. As a control they report 37 cases of scarlet fever among an unstated number of nurses and internes, who entered before they had been tested for susceptibility or who were known to have positive skin reactions and had not been immunized.

Interesting as these very recent statistics on the use of scarlet-fever streptococcus toxin are, yet they present nothing fundamentally new. Let us now consider a few facts known as early as 1905 and 1906, and even suspected as early as 1884. In 1906 Gabrichevsky, director of the Bacteriological Institute at the Moscow University, published (7) his method for preparing scarlatina vaccine by taking the organism direct from one sick with scarlatina and growing it in

bouillon. Gabrichevsky's vaccine combined our present sterile toxin with the killed organism. Small injections of this product into an individual produced no symptoms, whereas the injection of a large dose produced symptoms which are identical with the symptoms produced by the disease itself. Identical results are obtained to-day by the use of the sterile toxin produced according to the Dick method. Gabrichevsky states: "* * * All these symptoms are characteristic of scarlatina, and therefore the application of the vaccine gives a new, very important, argument in favor of the specificity of the scarlatina streptococcus and its toxin, as really it is to the latter, more than anything else, we have to ascribe these attacks."

Beginning in October, 1905, Langovoy (8) began observations on the action of Gabrichevsky's scarlatina vaccine at the St. Vladimir Hospital in Moscow, which work was performed upon the suggestion of Gabrichevsky. Langovoy reports 4 cases among 309 unvaccinated patients and 1 case among 120 vaccinated, but this 1 case developed before the immunization had been completed. Nikitin (9), at the request of Gabrichevsky, began using the latter's vaccine in the Zvenigorod district in January, 1906. At that time an epidemic of scarlet fever was raging, with a mortality of 20 per cent among those infected. The attack rate among the unvaccinated was 16 per cent, whereas among the vaccinated it was only 1.4 per cent, and this latter among those who had received only one injection.

Additional evidence could be presented. Agreement is fairly general that scarlet-fever streptococcus toxin has found a definite field of usefulness in the active immunization of persons susceptible to scarlet fever. However, agreement has not been reached as to the number of injections or the total dose of toxin required for the production of immunity. Enough must be given to produce a high percentage of immunes, but at the same time it must not be forgotten that reactions do occur. The reactions are not serious from the standpoint of endangering life, and therefore might be overlooked in institutional work, but they do become of great importance in private practice.

The time has not yet arrived for the proper evaluation of scarlet-fever streptococcus antitoxin in the treatment of scarlet fever. Numerous papers on this subject have appeared in medical literature. Although Toomey (10) found 125 such references listed in the Quarterly Cumulative Index up to June, 1928, he was unable, from the combined data therein contained, to form an opinion of the value of such antitoxin. The difficulty is that such clinical demonstrations are rarely controlled in the rigid manner required of scientific experiments. Eley (11), from his studies at the Willard Parker Hospital, concludes that scarlet-fever streptococcus antitoxin is of definite

value, but that mild and moderately sick patients do not receive enough benefit to warrant its use, because the reaction to the serum is more severe than the disease itself. Various clinicians, who are from experience qualified to form an opinion, have stated to the writer that it is their belief that a really potent scarlet-fever streptococcus antiserum is of benefit in the treatment of selected cases. We still are in need of a very closely controlled clinical demonstration of the therapeutic value of such antiserum.

In spite of the very considerable amount of work which has been done on the use of these new products in the prophylaxis and treatment of scarlet fever, there are certain shortcomings which need correction before the health officer can afford to push their use very energetically. Until we can correct these defects, their use by the practicing physician will remain very limited, and the public at large will not accept them to any great extent. I refer particularly to the present practice of using five injections of toxin, low in potency, relatively high in protein content, and which causes annoying reactions in a fairly large per cent of those treated. In order to attain general acceptance and usage, we must have a product which will require fewer doses and cause less reaction.

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ACUTE RESPONSE OF GUINEA PIGS TO VAPORS OF SOME NEW COMMERCIAL ORGANIC COMPOUNDS

IV.—ETHYLENE OXIDE[1]

By C. P. Waite, *Assistant Surgeon*,[2] F. A. Patty, *Assistant Physiological Chemist*, and W. P. Yant, *Supervising Chemist, Health Laboratory Section, Bureau of Mines Experiment Station, Pittsburgh, Pa.*

This report on the acute response of guinea pigs to ethylene oxide gas is the fourth of a series of similar reports which deal with studies pertinent to evaluating the hazards involved in exposure to some chemical products which have recently reached, or promise to reach, important domestic and industrial use. The first report of the series dealt with ethylene dichloride vapors,[3] the second with ethyl benzene vapor,[4] and the third with "Cellosolve" (ethylene glycol monoethyl ether).[5]

The investigation was undertaken at the request of the Carbide & Carbon Chemicals Corporation and was conducted jointly with the United States Bureau of Mines at its experiment station at Pittsburgh, Pa.

USE OF ETHYLENE OXIDE

Ethylene oxide is principally used as an intermediate in the synthesis of other compounds as methyl, ethyl, and butyl Cellosolve. It is also a promising fumigant, for use either alone[6] or mixed with carbon dioxide for stimulating the respiration of insects.[7] A fumigant containing 1 part ethylene oxide and 8 parts carbon dioxide is being marketed at the present time under the trade name "Carboxide."

SCOPE OF WORK

The scope of the work included a study of the toxicity of ethylene oxide and the physiological response to its vapors as determined by the exposure of guinea pigs. Only acute effects as produced by a single exposure were studied. The experiments were planned to give

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[1] This report represents work done under a cooperative agreement between the Bureau of Mines, Department of Commerce, and the Carbide & Carbon Chemicals Corporation. Published by permission of the Director, U. S. Bureau of Mines.

[2] Assistant surgeon, U. S. Public Health Service, detailed to the Bureau of Mines.

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information relative to the concentrations and periods of exposure which produce but slight response, moderate response, and serious response.

DESCRIPTION OF MATERIAL USED FOR TESTS

Ethylene oxide (CH_2CH_2O) is a colorless gas at ordinary room temperatures (boiling point 10.7° C.). It possesses a mild, sweetish odor and is readily soluble in water. The specific gravity is 0.887 at 7°/4° C. Its inflammability limits are 3 to 80 per cent by volume in air.[8]

The ethylene oxide used in the experiments described in this report was a plant product of 99.5 per cent purity as determined by specific gravity measurements. The volatile chlorides were less than 0.01

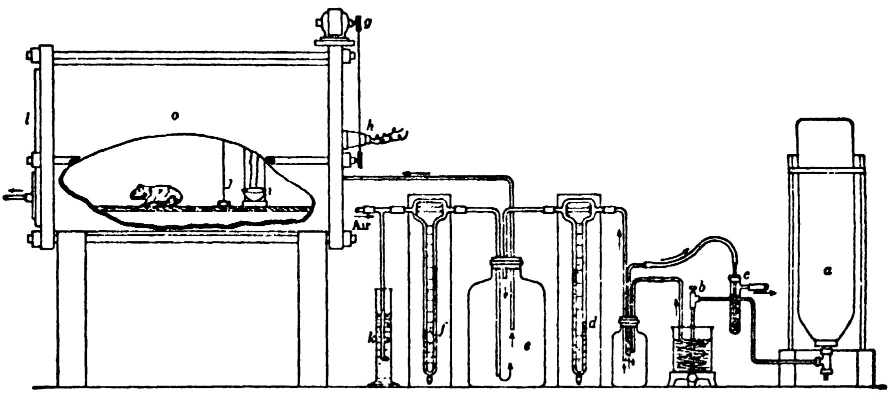

FIGURE 1.—Apparatus for preparing ethylene oxide-air mixtures which were near to or within the inflammable range

per cent as chlorine and the residue was less than 0.3 per cent by volume.

TEST APPARATUS

The apparatus used to prepare ethylene oxide air mixtures near to or within the inflammable range is shown in Figure 1. This apparatus differs from the one previously described in the report dealing with response to ethylene dichloride vapor, only in the method of preparing the gas-air mixtures. As ethylene oxide is a gas at room temperatures and is confined in steel cylinders under pressure, and ethylene dichloride is a liquid at room temperatures, the necessity for changing the method is obvious.

Referring to Figure 1, ethylene oxide confined as a liquid under pressure in steel container *a*, is released through the container valve and a needle valve *b* for regulating the flow, to a vaporizer consisting of a coil of copper tubing immersed in an electrically-heated water-bath. The vapors pass through a calibrated flowmeter *d* and are

[8] Jones, G. W.: U. S. Bureau of Mines, unpublished data.

mixed in *e* with a measured quantity of air from flowmeter *f*. The resultant mixture enters the chamber *o* and finally escapes through the outlet at the opposite end of *o*. The amount of air that passes through *f* is always equal to or greater than sufficient to effect three air changes per hour in *o*. Pressure regulators *k* and *c* maintain the pressure; consequently, they maintain a constant flow through the respective flowmeters after they are adjusted to give the desired gas-air mixture. Changes in gas concentrations are usually made by changing the height of the column of water in regulator *c*, and consequently the flow through *d*. The rate of vaporization of the liquid is regulated by needle valve *b* until there is a small but positive escape of excess vapor through the waste gas outlet of *c*.

The reason for vaporizing liquid material obtained from the inverted cylinder *a* was to assure that the vapor composition would be the same as the liquid composition. That condition could not be assumed when taking internally vaporized material from the vapor space of the cylinder in an upright position, because traces of impurities whose partial pressures were proportionately greater than their molar concentrations might be present.

As many of the vapor-air mixtures used for making exposures were within the inflammable range, a significant explosion hazard was obviously presented by the large volume of the mixture necessary for this type of work. Accordingly, to protect the persons engaged in the work, chamber *o* was constructed of steel capable of withstanding the force of an explosion. The chamber was also provided with a parchment relief diaphragm. The construction of the chamber has has been described in detail in a previous report.[3]

Ethylene oxide-air mixtures whose composition was within the safe range from the viewpoint of explosion hazards were prepared in the gas chamber shown in Figures 2 and 3. With the exception of the apparatus for preparing the gas-air mixtures this chamber was also the same as that previously described.[3]

The apparatus and method for preparing ethylene oxide-air mixtures in this large chamber (figs. 2 and 3) are much the same as for the small chamber *o* (fig. 1), except that the gas and air enter the chamber separately and are mixed inside the chamber rather than in an external reservoir as used with the apparatus shown in Figure 1.

COMPUTATION AND ANALYSIS OF GAS-AIR MIXTURES

The composition of the ethylene oxide-air mixtures were computed according to the formula $pv = RT$. As the gas is very soluble in water, the flowmeters were calibrated with air and the flow for ethylene

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[3] See footnote 3

oxide was computed on the basis of the viscosities or rates of flow being inversely proportional to the square roots of the densities of air and ethylene oxide, respectively. Although this is not considered to be an extremely accurate procedure, nevertheless the results

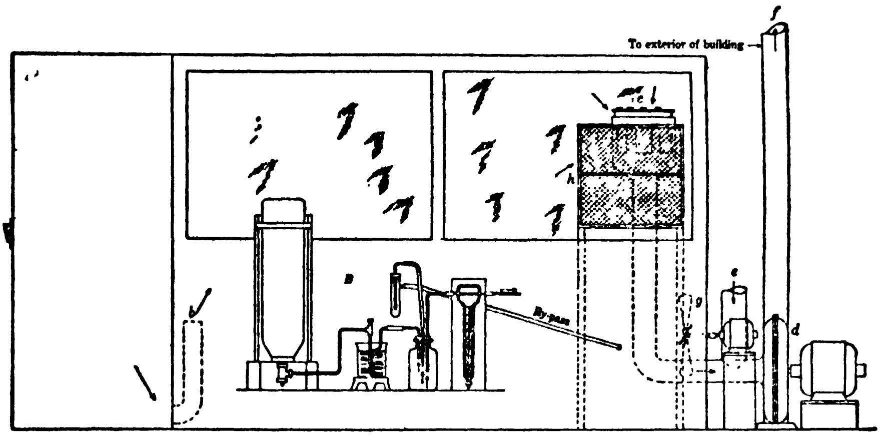

FIGURE 2.—Apparatus for making exposure to noninflammable ethylene oxide-air mixtures (side elevation plan)

given later in Table 1 substantiate its suitability for the purpose at hand.

The gas-air mixtures were created by adjusting the flowmeters of the vaporizing apparatus to give an atmosphere having the desired

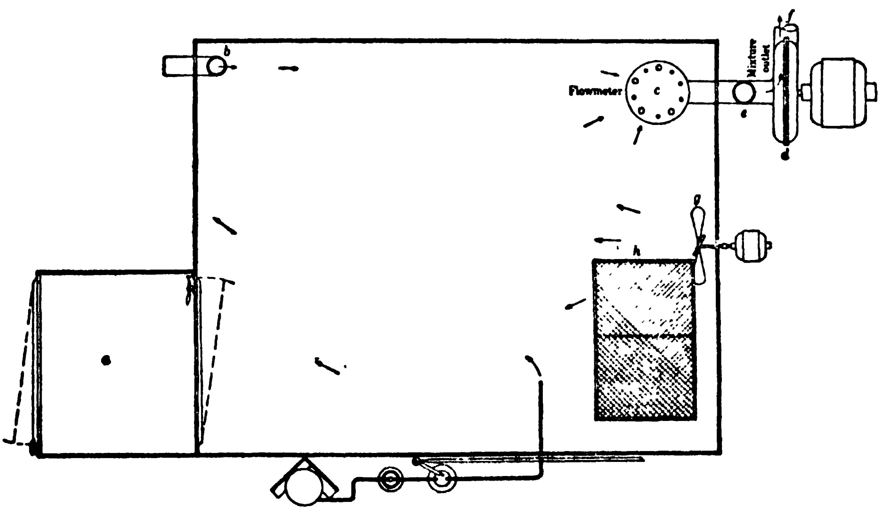

FIGURE 3.—Apparatus for making exposure to noninflammable ethylene oxide-air mixtures (horizontal plan)

proportions of gas and air. The composition of the atmosphere was then checked by analysis.

As ethylene oxide is readily soluble in water, ordinary gas volumetric methods of analysis in which the gas comes in contact with even traces of water or aqueous solutions can not be used. The method

employed in the investigation described in this report consisted of passing the gas-air mixture through a measured amount of 2–N HCl (in a Milligan or other efficient type of gas-scrubbing bottle) and subsequently determining the excess acid by titrating the whole or an aliquot part (well cooled) with standardized saturated barium hydroxide solution using methyl orange indicator. The ethylene oxide and hydrochloric acid react to form chlorhydrin. Sodium and potassium hydroxide were found to be unsatisfactory for determining the excess acid. It is presumed that they caused hydrolysis of the chlorhydrin, even when the solution was cooled.

The volume of gas-air mixture used for making a determination was measured by passing the effluent air from the absorption bottle through a gas meter (gas-calorimeter type). The volume of air indicated by the meter plus the amount of ethylene oxide found in the scrubbing bottle was taken as the total gas-air volume, and the proportion of ethylene oxide in the air was calculated on that basis.

The chemical method for ethylene oxide was occasionally checked by absorption with air-equilibrated charcoal and determining the gain in weight. Agreement of the results of analysis is shown in Table 1.

TABLE 1.—*Analysis of ethylene oxide-air mixtures, per cent by volume*

Expected from calculation	Found by titration method	Found by charcoal absorption
1.4	1.4	1.3
.7	.8	.7
.7	.6	----------

TEST PROCEDURE, DESCRIPTION, AND CARE OF ANIMALS

The test procedure and description and care of animals were the same as described in a previously published report dealing with ethylene dichloride.[3]

RESULTS OF TESTS

The detailed test data are too voluminous to be presented in this report and only summarized results pertinent to symptoms, gross pathology, and fatality are given here. Specimens of tissue were taken for microscopic examination, a report of which will be made later.

SYMPTOMS

Control animals.—No symptoms were exhibited by the 24 control guinea pigs used in these tests, and no deaths occurred.

Exposed animals.—Table 2 gives the symptoms shown by the animals exposed to vapors of ethylene oxide, also the average period

[3] See footnote 3.

of exposure necessary to produce these symptoms by various concentrations of vapor in air. When viewing the table the reader should note that the figures in parentheses indicate that the particular symptom did not occur in the maximum period of test as given.

Nasal irritation shown by the guinea pigs scratching at the nose was an early and constant symptom in all the pigs except those exposed to 0.025 per cent ethylene oxide in air. The time of onset and the severity of the irritation was directly dependent on the concentration of the vapors.

TABLE 2.—*Symptoms produced in guinea pigs during exposure to vapors of ethylene oxide*

Type of symptom	Concentration of vapor and period of exposure causing symptoms [1]									
	8.5	6.3 to 6.4	5.1	4	1.4 to 2.5	0.7	0.3	0.13	0.06	0.025
Nasal irritation; scratching at nose	([2])	([2])	([2])	([2])	([2])	4	30	30	30–60	[3](480)
Eye irritation; squinting and lacrimation	1–2	1–2	1–2	2–4	4–8	4–7	30	30	60–120	[3](480)
Blood tinged, frothy serous exudate from nostrils	[3](37)	[3](20)	[3](5)	[3](20)	60	150	330	([4])	[3](480)	[3](480)
Unsteadiness on feet, staggering	9	9–11	([4])	[3](20)	45	([4])	([4])	([4])	[3](480)	[3](480)
Animals on sides; unable to stand; quiet	12–18	17	[3](5)	[3](20)	50–107	150	([4])	([4])	[3](480)	[3](480)
Respiratory cycle first affected; increase in rate and amplitude, usually slowed in rate at first in high concentrations	13	17	[3](5)	([4])	([4])	35	([4])	[3](480)	[3](480)	[3](480)
Dyspnea progressing to gasping accompanied by use of accessory muscles and raising of head	30	[3](20)	[3](5)	20	50–90	45–60	330	[3](480)	[3](480)	[3](480)

[1] Concentration of vapor in per cent by volume; time in minutes
[2] Occurs immediately after being put on test.
[3] Not observed during maximum period of exposure as given in parentheses.
[4] Not determined.

Profuse lacrimation, blinking, and squinting of the eyes were also constant symptoms, except in the lowest concentration used, 0.025 per cent. These symptoms also apparently varied in severity directly with the concentration. Examination of the eyes of the animals immediately after removal from the exposure chamber showed a distinct reddening of the conjunctiva and prominence of the vessels of the sclera at either canthus of the eye. The irritation was evidently dependent on direct exposure and had no after-effects, as examination of the eyes of those pigs that survived 24 hours after exposure was negative.

A frothy, blood-tinged, serous exudate effused from the nostrils at the end of exposure to 2.5 per cent ethylene oxide for 1 hour, 1.4 per cent for 1 and 2 hours, 0.7 per cent for 2½ hours, and 0.3 per cent for 6 hours.

Exposure to 8.5, 6.3, and 6.4 per cent ethylene oxide in air caused the animals to become unsteady on their feet and stagger on attempt-

ing to move about within 10 minutes, and at the end of 15 minutes to fall on their sides, in which condition they remained until the end of the exposures or until death occurred. Pigs exposed to 1.4 per cent were unsteady within 45 minutes and fell to their sides within 50 to 107 minutes; exposure to 0.7 per cent caused the animals to fall on their sides in 150 minutes.

The respirations were apparently increased in rate and amplitude at the end of 8 hours' exposure to 0.13, 0.06, and 0.025 per cent. The first effect of higher concentrations, 8.5, 6.4, and 0.7 per cent was to increase the depth or amplitude and slow the rate of respirations within 13, 17, and 35 minutes, respectively.

Dyspnea, progressing to gasping, with employment of accessory muscles of respiration and the lifting of the head, was observed after 30 minutes' exposure to 8.5 per cent and after 20, 50–90, 45–80, and 330 minutes' exposure to 4.0. 1.4, 0.7, and 0.3 per cent, respectively.

Exposure to 0.025 per cent for 8 hours did not produce any of the foregoing symptoms described.

DISCUSSION OF SYMPTOMS

Ethylene oxide is apparently extremely irritating to the eyes. Signs of such irritation were exhibited by all exposed pigs except those subjected to the lowest concentration, 0.025 per cent. This irritation apparently produces no permanent lesion, and disappears after removal from the atmosphere containing the vapors.

The remaining symptoms exhibited by the pigs may be ascribed to the irritative effect of the gas on the respiratory system. The changes in the respirations are those which might be expected from a respiratory irritant, likewise the unsteadiness and falling to the sides, which is probably explainable on the basis of insufficient oxygenation resulting from constriction and obstruction of the air passages.

Irritation of the upper respiratory passages as shown by the presence of a thin, serous, frothy, blood-tinged exudate about and in the nostrils did not occur in the highest concentrations of the vapors. This is probably due to insufficient time for its occurrence. Exposures to the lowest concentrations (0.13 and 0.025 per cent) for long periods (8 hours) likewise did not produce this symptom. All of the animals that showed this exudation from the nostrils died on test as in the case of exposure to 0.7 per cent for 2½ hours, or within 4 hours after removal from exposure.

GROSS PATHOLOGY

Control animals.—A total of 24 control animals were killed for autopsy. The animals were taken from the same stock and selected in the same manner as the groups of animals used for exposure to ethylene oxide-air mixtures.

Exposed animals.—Examination of the pigs that died during exposure (see fig. 4 for conditions of exposure causing death on test) revealed a large amount of lacrimal secretion collected on the fur about the eyes. The conjunctiva was reddened. The nostrils were

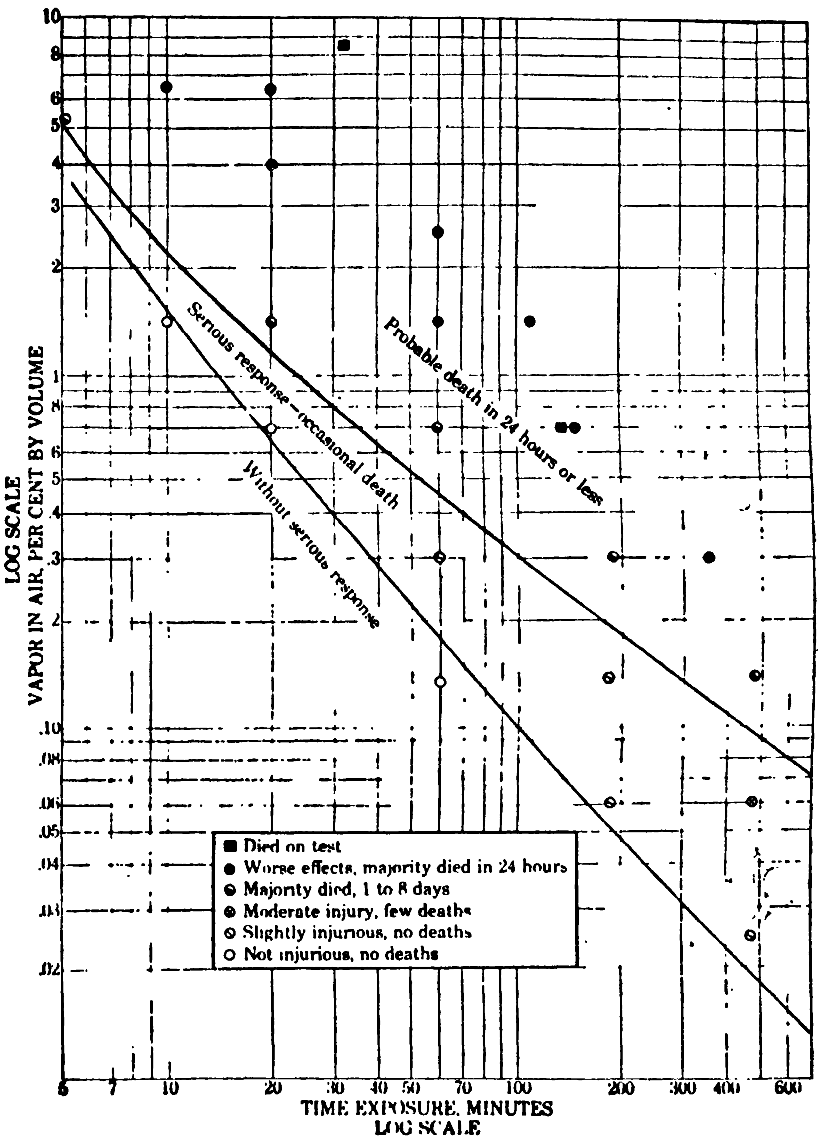

FIGURE 4.—Acute effects of exposure of guinea pigs to ethylene oxide vapor in air

filled with a thin, frothy, serous exudate. The mucous membrane of the mouth was pale and cyanotic.

Examination of the internal viscera revealed a large amount of congestion and edema of the lungs. The trachea and bronchi contained a frothy, serous, exudate, and their mucous membrane was reddened. Cut section of the lungs was moist, deep red in color, and bled freely. There were irregular-shaped areas of deeper red

mottling throughout. Pressure expressed a large amount of frothy, bloody fluid from the bronchioles and air sacs. The liver was deep red to purple in color and welled blood on cutting. The surface vessels of the pancreas were prominent. The kidneys were tense to palpation and deep red to purple in color. Cut section bled freely.

The findings in pigs which were exposed to conditions that caused death to majority of the animals in less than 24 hours following exposure were the same as the above—that is, acute congestion and edema of the lungs with a hyperemia of the liver and kidneys. All of these animals (represented by filled circles in fig. 4) died within 3½ hours after removal from test.

Animals killed for autopsy immediately after exposure to conditions that caused death to the majority within 1 to 8 days (represented in fig. 4 by half-filled circles) were practically negative for gross changes, except some evidence of congestion of the lungs noted in two instances (exposures to 0.3 per cent for 3 hours and 0.13 per cent for 8 hours). The pigs that died in 1 to 6 days after exposures showed characteristic changes in the lungs common to all. The lungs were voluminous and did not collapse on opening the chest. They were deep pink to red in color, mottled with numerous dark red or reddish brown areas of irregular shape and size. These areas were separated by portions of lung tissues light in color. On cut sections the areas were firm, noncrepitant and presented a moist, red, granular surface. In one instance the upper lobes of both lungs were consolidated, being dark red in color, firm to touch and noncrepitant. In another instance, areas of red and gray hepatization were found scattered throughout the cut section of one lobe.

In addition to the changes in the lungs noted above, if the animals did not die until after the second day there were evident changes in the kidneys. The kidneys were pale and boggy to palpation. The cut section was also pale, with a yellowish discoloration and a thickening of the cortex. The 2 pigs which were killed 3 and 4 days after exposure (exceptions noted previously) exhibited the same changes.

Exposure to conditions that did not cause death or serious injury (represented in fig. 4 by halved circles) produced a slight congestion of the lungs as noted in the animals killed immediately after exposure. In animals killed four days following exposure, there were slight changes in the kidneys similar in type to those previously described. Eight days following exposure the findings were negative.

A slate gray discoloration of the liver was noted in those pigs that were exposed to 1.4 per cent vapors for 1 and 2 hours.

DISCUSSION OF PATHOLOGICAL FINDINGS

The gross pathological changes in the respiratory system of guinea pigs exposed to ethylene oxide gas are similar to those produced by

the inhalation of irritating gases, such as chlorine. The acute irritation to the air passages and lungs is the most prominent picture presented by the animals that died during exposure or within a few hours following exposure. Animals that died in 1 to 6 days after exposure show an added infective process involving the lungs resulting in the occurrence of lobar and lobular pneumonia, chiefly the latter. The occurrence of the changes resembling pneumonic processes are apparently increased in frequency with the time of delay of death. In these instances—that is, deaths occurring 2 to 6 days after exposure—there is also evidence of parenchymatous changes in the kidneys.

SUMMARY OF FATALITY AND PHYSIOLOGICAL RESPONSE

A summary of the fatality and response of guinea pigs exposed to various concentrations of ethylene oxide in air is shown graphically in Figure 4 and given in four conventional degrees of response in Table 3. In Figure 4 the results of each experiment are designated by a symbol which represents one of six different degrees of severity. The selected symbol describes the results obtained for at least one-half the individual animals and in most cases the results for the majority or all of the group (at least three and usually six animals) exposed to a given condition.

The following are the six degrees of response in Figure 4:

1. Died on test.
2. Majority died within 24 hours.
3. Majority died, 1 to 8 days.
4. Moderate injury, few deaths.
5. Slightly injurious, no deaths.
6. Not injurious, no deaths.

In addition to representing the response of each group by symbols, the latter have been separated into three general fields or zones of probable response; namely,

1. Probable death, 24 hours or less.
2. Serious response, occasional death.
3. Without serious response.

Table 3 gives the concentration of ethylene oxide in air that produces the four degrees of response usually reported in the literature dealing with noxious gases. These data may be compared with toxicological data for other compounds.[3 4 5 9 10 11 12]

[3 4 5] See previous footnotes.
[9] Sayers, R. R., Yant, W. P., Thomas, B. G. H., and Berger, L. B.: Physiological response attending exposure to vapors of methyl bromide, methyl chloride, ethyl bromide, and ethyl chloride. Pub. Health Bull. No. 185, 1929.
[10] International Critical Tables, first edition, 1927, vol. 2, p. 318. Also see errata sheet, vol. 2.
[11] Henderson, Yandell, and Haggard, Howard W.: Noxious Gases. American Chemical Society Monograph No. 35, 1927, Chemical Catalog Co., New York.
[12] Fieldner, A. C., Katz, S. H., and Kinney, S. P.: Gas masks for gases met in fighting fires. U. S. Bureau of Mines Tech. Paper 248, 1921.

TABLE 3.—*Acute effects of exposure of guinea pigs to ethylene oxide in air, concentration in per cent by volume*

Kills in a very short time	5 to 10
Dangerous in 30 to 60 minutes	0.3 to 0.6
Maximum amount for 60 minutes without serious disturbances	0.3
Slight symptoms after several hours or maximum amount without serious disturbances	0.025

RELATION OF SYMPTOMS TO FATALITY FOLLOWING EXPOSURE

There appeared to be a direct relation between the severity of the symptoms of irritation of the respiratory system and death. All animals that showed an exudate from the nostrils died within the 24 hours following exposure.

GENERAL DISCUSSION OF HEALTH HAZARDS AND WARNING PROPERTIES

A comparison with the toxicological data reported for other compounds [3 4 5 9 10 11 12] indicates that from the standpoint of concentrations in air causing harm, ethylene oxide is less harmful to breathe than other common irritating gases, such as hydrogen chloride or sulphur dioxide, but it is a good deal more harmful than carbon tetrachloride and chloroform. In general, its harmful concentrations are similar to ammonia.

The hazard to health is mainly due to low concentrations which persons may endure for a period long enough to cause marked irritation of the respiratory system. Although ethylene oxide does not possess a distinct odor to give warning of its presence in these low concentrations, it is fortunately an irritant and in that manner gives warning.

ACKNOWLEDGMENTS

The writers desire to give acknowledgment to J. G. Davidson, manager of chemical sales of the Carbide & Carbon Chemicals Corporation, and to E. W. Reid, senior fellow of this firm's fellowship at the Mellon Institute, Pittsburgh, Pa., for sponsoring the investigation, and to R. R. Sayers, chief surgeon, Bureau of Mines, for suggestions and advice, and H. F. Brubach, laboratory assistant, Bureau of Mines, for assistance in performing the experimental work.

SUMMARY AND CONCLUSIONS

The acute physiological response of guinea pigs to air containing ethylene oxide was determined. The concentration of vapor and periods of exposure ranged from those which produced death to those which caused no apparent effect after several hours' exposure. The symptoms, gross pathology, and fatality are given, with a discussion of the potential health hazards.

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3 4 5 9 10 11 12 See previous footnotes.

1. In the order of occurrence the symptoms produced are nasal irritation, eye irritation, blood-tinged, frothy, serous exudate from nostrils, unsteadiness on feet and staggering, inability to stand, respiratory disturbances, dyspnea and gasping, and death. Most of these symptoms occurred with exposures to concentrations of 8.5 to 0.3 per cent by volume. Eye and nose irritation were the principal symptoms with exposure to 0.13 and 0.06 per cent; no distinct symptoms were observed with exposure to 0.025 per cent.

2. The principal gross pathological change was marked irritation of the respiratory system. This was most prominent in animals that died within a few hours following exposure. Lobar and lobular pneumonia and parenchymatous changes in the kidneys were noted in the animals that died 2 to 6 days following exposure.

3. Exposure to 5 to 10 per cent causes death after a few minutes exposure; 0.3 to 0.6 per cent for 30 to 60 minutes is dangerous to the life of guinea pigs; 0.3 per cent is the maximum for 60 minutes without serious disturbances; and 0.025 per cent is the maximum allowable concentration for several hours without serious disturbances.

4. From the standpoint of relative toxicity (concentrations causing acute harm) ethylene oxide is less harmful than hydrogen chloride and sulphur dioxide, more harmful than chloroform and carbon tetrachloride, and similar to ammonia.

5. Ethylene oxide does not possess enough odor to give distinct warning of harmful concentrations, but it causes intolerable irritation to the eyes and nose when present in high concentrations, and moderate though distinct irritation in comparatively safe concentrations. This irritation must, however, be taken as warning of a dangerous atmosphere to avoid serious injury.

COURT DECISION RELATING TO PUBLIC HEALTH

Disposal of sewage by city into tidal waters held not to be a nuisance and injunction refused.—(Maryland Court of Appeals; Cityco Realty Co. *v.* Mayor, Counselor, and Aldermen of City of Annapolis, 150 A. 273; decided May 15, 1930.) The city of Annapolis discharged, and had done so for many years, untreated sewage into adjacent tidal waters. The waters were heavily polluted, and the State legislature had taken note of this condition in legislation enacted by it. The plaintiff company, which owned some land bounding in part on the polluted waters, sought to enjoin the city from discharging sewage into the tidal waters, it being contended that the polluted condition of the waters made their property, intended for subdivision into building lots, practically unsalable. The conditions complained of had

existed long before the company bought the land in question. The trial court dismissed the bill and the company appealed. The court of appeals stated that, assuming that a public nuisance which injuriously and specially affected private rights could be enjoined, the questions presented were (1) whether the acts complained of constituted a nuisance, and (2) whether, if they did, they should be restrained under the circumstances of the case. It was said that the rule, recognized wherever the question had arisen in the courts of this country or England, was that the discharge by a municipality, acting in the exercise of power conferred by the State, of sewage into tidal waters was not a nuisance. The court said, however, that the rule did not protect a municipality where, through negligence or a wanton disregard of public or private rights, it does in fact create a nuisance or actually invades private property. Proceeding, the court then stated that "as there is no evidence of any negligence or misconduct in this case, it follows that the acts complained of do not constitute a nuisance if done under the authority of the State."

The substance of certain statutes was then given and regarding these it was said:

Construing these statutes together, they are sufficient to authorize the State department of health, in the exercise of a power validly delegated to it by the legislature, to assent, on the part of the State, to the discharge of sewage into Spa Creek. And since it appears that since 1914 the State department of health has expressly authorized the construction of new sewers which discharge their effluent into those waters, and as the sewage from the Statehouse and other State property is and for a long time has been discharged through these sewers into the same waters, it may be reasonably presumed that the State has not only expressly assented to that use of Spa Creek by the appellee since 1914, but it may also be inferred that it ratified the acts of the appellee in constructing, prior to 1914, sewers discharging into it. Our conclusion, therefore, is that the acts of which appellant complains do not constitute a nuisance, that it is not entitled to the relief prayed, and that its bill was properly dismissed. It follows that the decree appealed from will be affirmed.

DEATHS DURING WEEK ENDED JULY 26, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended July 26, 1930, and corresponding week of 1929. (From the Weekly Health Index July 31, 1930, issued by the Bureau of the Census, Department of Commerce)

	Week ended July 26, 1930	Corresponding week, 1929
Policies in force	76, 003, 866	74, 539, 596
Number of death claims	14, 064	12, 239
Death claims per 1,000 policies in force, annual rate	9. 6	8. 6

Deaths from all causes in certain large cities of the United States during the week ended July 26, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, July 31, 1930, issued by the Bureau of the Census, Department of Commerce)

City	Week ended July 26, 1930		Annual death rate per 1,000 corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended July 26, 1930 [2]
	Total deaths	Death rate [1]		Week ended July 26, 1930	Corresponding week 1929	
Total (65 cities)	7, 205	12. 6	10. 8	728	586	[3] 64
Akron	59			10	4	91
Albany [4]	82	13. 9	13. 9	2	5	44
Atlanta	89	18. 2	18. 6	15	10	159
White	42			9	5	286
Colored	47	(5)	(5)	6	5	95
Baltimore [4]	286	18. 0	11. 9	26	15	88
White	209			16	9	69
Colored	77	(5)	(5)	10	6	162
Birmingham	64	15. 0	13. 8	12	2	112
White	26			4	2	62
Colored	38	(5)	(5)	8	0	189
Boston	187	12. 2	11. 2	23	10	65
Bridgeport	28			1	2	17
Buffalo	124	11. 6	9. 2	12	7	53
Cambridge	12	5. 0	10. 8	2	2	37
Camden	41	15. 8	13. 5	10	3	181
Canton	19	8 5	6. 2	1	1	25
Chicago [4]	637	10. 5	10. 3	42	51	37
Cincinnati	161			18	10	107
Cleveland	196	10. 1	8. 9	19	16	57
Columbus	97	16. 9	10. 5	9	7	88
Dallas	55	13. 2	12. 7	10	7	
White	40			5	6	
Colored	15	(5)	(5)	5	1	
Dayton	44	12. 4	10. 7	4	2	59
Denver	70	12. 4	11. 7	7	8	73
Des Moines	28	9. 6	9. 6	2	3	35
Detroit	250	9. 5	9. 0	37	32	57
Duluth	25	11. 2	9. 4	4	0	108
El Paso	84	15. 0	11. 5	7	6	
Erie	29			2	1	43
Fall River [4]	27	10. 5	8. 9	3	3	69
Flint	16	5. 6	8. 8	4	3	47
Fort Worth	32	9. 8	10. 7	1	6	
White	29			1	5	
Colored	3	(5)	(5)	0	1	
Grand Rapids	27	8. 6	12. 4	2	7	30
Houston	52			8	5	
White	30			4	5	
Colored	22	(5)	(5)	4	0	
Indianapolis	91	12. 4	12. 0	9	7	67
White	76			7	6	61
Colored	15	(5)	(5)	2	1	108
Jersey City	65	10. 4	11. 4	9	8	78
Kansas City, Kans	29	12. 8	17. 6	1	3	24
White	23			1	3	27
Colored	6	(5)	(5)	0	0	0
Kansas City, Mo	116	15. 5	11. 9	13	6	101
Knoxville	25	12. 4	9. 9	7	3	164
White	20			5	3	130
Colored	5	(5)	(5)	2	0	494

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended July 26, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, July 31, 1930, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended July 26, 1930		Annual death rate per 1,000 corresponding week, 1929	Deaths under 1 year		Infant mortality rate, week ended July 26, 1930 [2]
	Total deaths	Death rate [1]		Week ended July 26, 1930	Corresponding week 1929	
Los Angeles	209			24	13	73
Louisville	76	12.0	12.7	8	10	70
White	52			7	10	69
Colored	24	(5)	(5)	1	0	72
Lowell	23			0	4	0
Lynn	22	10.9	5.9	3	1	76
Memphis	63	17.3	17.5	10	9	119
White	32			7	6	129
Colored	31	(5)	(5)	3	3	101
Milwaukee	92	8.8	8.9	7	9	35
Minneapolis	71	8.1	10.8	5	3	32
Nashville	53	19.8	16.4	8	6	124
White	26			5	5	103
Colored	27	(5)	(5)	3	1	190
New Bedford	25			1	1	26
New Haven	32	8.9	10.0	5	0	97
New Orleans	121	14.7	16.8	21	17	122
White	66			11	8	97
Colored	55	(5)	(5)	10	9	168
New York	1,541	13.4	10.1	152	119	64
Bronx borough	223	12.2	8.5	16	12	38
Brooklyn borough	515	11.6	8.0	65	32	69
Manhattan borough	597	17.8	14.6	56	60	92
Queens borough	157	9.6	7.9	13	13	38
Richmond borough	49	17.0	12.5	2	2	37
Newark, N. J	79	8.7	9.4	7	12	37
Oakland	54	10.3	10.3	5	3	60
Oklahoma City	49			9	3	177
Omaha	72	16.9	13.8	6	7	68
Paterson	23	8.3	7.9	1	1	17
Philadelphia	559	14.1	9.4	62	29	92
Pittsburgh	161	12.5	12.5	17	20	62
Portland, Oreg	59			3	0	37
Providence	58	10.6	9.3	4	9	37
Richmond	72	19.3	16.4	9	7	133
White	38			2	4	45
Colored	34	(5)	(5)	7	3	305
Rochester	69	11.0	10.0	4	9	35
St. Louis	262	16.1	12.6	23	16	75
St. Paul	44			3	1	30
Salt Lake City [4]	120	7.6	12.8	1	2	16
San Antonio	136	32.5	12.4	16	9	
San Diego	44			3	4	63
San Francisco	191	17.0	17.7	5	9	34
Schenectady	22	12.3	12.9	2	2	62
Seattle	65	8.8	8.0	1	5	10
Somerville	7	3.6	6.1	0	1	0
Spokane	23	11.0	7.2	1	0	26
Springfield, Mass	22	7.7	7.3	3	1	47
Syracuse	37	9.7	9.4	6	3	74
Tacoma	27	12.7	9.0	0	2	0
Toledo	81	13.5	12.8	5	7	46
Trenton	42	15.8	15.0	4	4	74
Utica	27	13.5	12.0	2	3	57
Washington, D. C	182	17.2	10.9	23	14	134
White	108			10	7	86
Colored	74	(5)	(5)	13	7	231
Waterbury	20			1	2	26
Wilmington, Del	30	12.2	8.1	2	0	45
Worcester	44	11.6	8.4	4	1	52
Yonkers	17	7.3	7.3	2	0	48
Youngstown	34	10.2	5.7	1	3	16

[1] Annual rate per 1,000 population, estimated for the year 1928.
[2] Deaths under 1 year per 1,000 births. Cities left blank are not in the registration area for births.
[3] Data for 73 cities.
[4] Deaths for week ended Friday.
[5] In the cities for which deaths are shown by color, the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended July 26, 1930, and July 27, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 26, 1930, and July 27, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 26, 1930	Week ended July 27, 1929	Week ended July 26, 1930	Week ended July 27, 1929	Week ended July 26, 1930	Week ended July 27, 1929	Week ended July 26, 1930	Week ended July 27, 1929
New England States:								
Maine	4	2	1	1	6	19	0	0
New Hampshire	1				5	16	0	0
Vermont		1			1	3	0	0
Massachusetts	23	46		4	153	149	1	4
Rhode Island	1	2			10	9	0	0
Connecticut	6	13		4	8	18	2	2
Middle Atlantic States:								
New York	63	124		[1] 4	360	200	8	18
New Jersey	52	48			172	28	5	4
Pennsylvania	69	84			269	323	6	8
East North Central States:								
Ohio	17	50	7	9	73	195	3	3
Indiana	4	12	2		13	21	5	1
Illinois	64	129	2	25	56	244	3	9
Michigan	67	62	2		98	116	5	12
Wisconsin	15	20	4	11	112	275	2	2
West North Central States:								
Minnesota	16	10			11	38	1	2
Iowa	4	7			8	9	0	1
Missouri	11	7			21	11	0	5
North Dakota	4	1			6	19	1	2
South Dakota	1				12	1	0	0
Nebraska	6	2			4	24	0	0
Kansas	6	2			38	51	3	0
South Atlantic States:								
Delaware	1				5	2	0	0
Maryland [2]	13	7	2	3	8	7	2	1
District of Columbia	8	6			13		0	0
Virginia								
West Virginia	5	10	10		17	27	1	0
North Carolina	27	26	2		10		0	0
South Carolina	8	20	68	33			0	0
Georgia	5	9	13	8	37	1	1	0
Florida	4	2		2	5	9	0	0

[1] New York City only.
[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 26, 1930, and July 27, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 26, 1930	Week ended July 27, 1929	Week ended July 26, 1930	Week ended July 27, 1929	Week ended July 26, 1930	Week ended July 27, 1929	Week ended July 26, 1930	Week ended July 27, 1929
East South Central States:								
Kentucky							2	0
Tennessee	2	1	3	6	3	10	1	0
Alabama	10	12	3	3	33	12	0	0
Mississippi	9	10					1	0
West South Central States:								
Arkansas	1	2	5	7		18	1	0
Louisiana	6	19	6	10	5	2	1	2
Oklahoma [3]	4	5	2	38	7	4	1	4
Texas	2	22	10	3	28	4	0	0
Mountain States:								
Montana		6			7	14	0	1
Idaho		2			5	18	0	0
Wyoming	1				16	9	0	1
Colorado	8	3			23	7	0	0
New Mexico	2	3			10	5	0	2
Arizona	1	2			18		1	0
Utah [2]				4	7	1	1	1
Pacific States:								
Washington	4	9			63	24	2	1
Oregon	4	9	4		29	23	0	0
California	26	29	11	7	181	43	4	17

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 26, 1930	Week ended July 27, 1929	Week ended July 26, 1930	Week ended July 27, 1929	Week ended July 26, 1930	Week ended July 27, 1929	Week ended July 26, 1930	Week ended July 27, 1929
New England States:								
Maine	0	0	16	8	0	0	2	8
New Hampshire	0	0	0	3	0	0	0	0
Vermont	0	4	1	2	0	0	0	0
Massachusetts	6	1	50	47	0	0	2	13
Rhode Island	0	0	6	4	0	0	0	3
Connecticut	4	2	10	11	0	0	2	1
Middle Atlantic States:								
New York	15	10	93	61	4	0	25	20
New Jersey	0	1	20	28	0	0	6	5
Pennsylvania	5	1	80	105	0	0	25	45
East North Central States:								
Ohio	3	3	55	98	37	58	27	28
Indiana	0	0	20	42	40	26	6	7
Illinois	6	1	72	134	38	34	32	19
Michigan	0	1	51	82	34	61	10	11
Wisconsin	0	1	36	44		11	3	2
West North Central States:								
Minnesota	16	2	16	33	2	3	5	4
Iowa	1	0	2	13	21	37	1	3
Missouri	0	0	9	13	25	2	13	11
North Dakota	1	0	10	6	9	3	1	1
South Dakota	1	0	3	1	10	10	1	0
Nebraska	0	0	4	12	18	8	17	1
Kansas	7	2	23	30	20	20	16	13
South Atlantic States:								
Delaware	0	1	5	1	0	0	0	0
Maryland [2]	1	0	6	28	0	0	25	17
District of Columbia	0	0	2	3	0	0	1	2
Virginia		[4] 34						
West Virginia	1	1	23	12	3	4	28	24
North Carolina	3	11	22	19	4	7	56	53
South Carolina	2	1	2	6	0	2	70	50
Georgia	0	0	10	5	0	0	73	47
Florida	0	0	2	5	2	0	0	9

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.
[4] Includes 33 cases reported from Roanoke City from July 5 to July 29.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 26, 1930, and July 27, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 26, 1930	Week ended July 27, 1929	Week ended July 26, 1930	Week ended July 27, 1929	Week ended July 26, 1930	Week ended July 27, 1929	Week ended July 26, 1930	Week ended July 27, 1929
East South Central States:								
Kentucky	0	1	5	22	11	0	39	28
Tennessee	0	3	13	4	8	6	50	80
Alabama	2	0	9	15	0	0	36	39
Mississippi	4	0	2	6	1	0	58	47
West South Central States:								
Arkansas	7	0	2	9	4	0	30	32
Louisiana	27	0	9	14	6	0	52	32
Oklahoma [3]	12	0	10	6	38	9	42	55
Texas	2	0	6	17	8	5	20	28
Mountain States:								
Montana	0	0	8	5	0	3	2	0
Idaho	0	0	0		1	0	1	1
Wyoming	0	0	2	1	2	8	0	2
Colorado	1	0	3	5	2	19	1	7
New Mexico	1	1	2	2	6	2	8	6
Arizona	3	0	3		1	5	4	0
Utah [2]	0	0	2	3	0	0	1	1
Pacific States:								
Washington	0	0	13	4	21	41	4	1
Oregon	1	1	3	4	5	13	4	3
California	89	4	44	107	6	20	32	20

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May, 1930										
Hawaii Territory	1	39	11		203		3	3	0	6
June, 1930										
Alabama	9	32	52	646	404	129	9	32	19	64
Idaho	5	5			46		0	13	24	2
Louisiana	5	59	29	195	41	186	66	63	8	108
Maine	3	35	5		197		0	40	0	7
Ohio	18	127	27	1	1,808		8	627	328	43
Oklahoma [1]	5	34	38	187	233	102	15	53	287	48
Oregon	1	15	24	1	386		1	39	69	16
Rhode Island	0	17	1		100		0	46	0	1
South Dakota	1	27	5		415		1	21	129	1
Washington	7	15	24	2	1,876		4	63	139	17
Wisconsin	10	50	22		1,735		4	329	88	9

[1] Exclusive of Oklahoma City and Tulsa.

May, 1930

Hawaii Territory:	Cases
Chicken pox	51
Conjunctivitis (follicular)	104
Dysentery (bacillary)	2
Hookworm disease	15
Impetigo contagiosa	1

Hawaii Territory—Continued.	Cases
Leprosy	1
Mumps	31
Tetanus	1
Trachoma	36
Whooping cough	21

June, 1930

	Cases
Anthrax:	
Louisiana	1
Oklahoma [1]	1
Chicken pox:	
Alabama	57
Idaho	75
Louisiana	26
Maine	125
Ohio	1,016
Oklahoma [1]	4
Oregon	91
Rhode Island	87
South Dakota	44
Washington	179
Wisconsin	894
Conjunctivitis:	
Maine	4
Oklahoma [1]	1
Dengue:	
Alabama	2
Diarrhea and enteritis (under 2 years):	
Ohio	18
Dysentery:	
Louisiana	4
Maine	2
Ohio	38
Food poisoning:	
Ohio	18
German measles:	
Maine	25
Ohio	15
Rhode Island	50
Washington	127
Wisconsin	65
Hookworm disease:	
Louisiana	28
Impetigo contagiosa:	
Oregon	3
Lead poisoning:	
Ohio	8
Leprosy:	
Louisiana	1
Lethargic encephalitis:	
Louisiana	3
Oregon	1
Washington	4
Wisconsin	2
Mumps:	
Alabama	65
Idaho	22
Louisiana	5
Maine	217
Ohio	353
Oklahoma [1]	13
Oregon	85
Rhode Island	2
South Dakota	11
Washington	292
Wisconsin	579
Ophthalmia neonatorum:	
Louisiana	1
Ohio	76

[1] Exclusive of Oklahoma City and Tulsa.

	Cases
Paratyphoid fever:	
Louisiana	11
Maine	1
Oregon	1
Puerperal septicemia:	
Ohio	11
Washington	5
Rabies in animals:	
Louisiana	13
Rhode Island	11
Rocky Mountain spotted or tick fever:	
Idaho	2
Oregon	9
Scabies:	
Oregon	2
Septic sore throat:	
Idaho	1
Louisiana	1
Ohio	35
Oklahoma [1]	14
Washington	1
Tetanus:	
Louisiana	10
Maine	1
Ohio	12
South Dakota	1
Washington	1
Trachoma:	
Ohio	6
Oklahoma [1]	14
Rhode Island	1
South Dakota	2
Wisconsin	1
Tularaemia:	
Alabama	1
Idaho	1
Louisiana	2
Oregon	1
Typhus fever:	
Alabama	5
Undulant fever:	
Alabama	1
Maine	2
Ohio	81
Washington	4
Vincent's angina:	
Maine	7
Oklahoma [1]	1
Oregon	6
Washington	59
Whooping cough:	
Alabama	197
Idaho	73
Louisiana	27
Maine	77
Ohio	608
Oklahoma [1]	107
Oregon	160
Rhode Island	82
South Dakota	27
Washington	225
Wisconsin	672

Cases of Certain Communicable Diseases Reported for the Month of March, 1930, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	248	12	280	410	240	0	48	11	173
New Hampshire		17			77	0		1	
Vermont	228	6	142	20	49	15	19	0	26
Massachusetts	974	282	3,798	1,022	1,171	1	577	8	1,503
Rhode Island	70	57	16	2	108	0	33	0	156
Connecticut	489	85	90	178	580	0	138	6	197
New York	2,940	607	8,688	2,852	2,589	41	1,911	87	1,990
New Jersey	1,337	523	8,209		1,195	0	444	15	624
Pennsylvania	2,812	601	4,865	1,712	2,123	7	[1] 613	47	1,458
Ohio	2,162	249	3,098	984	1,750	823	642	87	803
Indiana	460	106	493	49	961	781	328	12	205
Illinois	1,399	064	2,761	977	2,512	536	976	23	834
Michigan	1,129	288	4,231	841	1,472	820	584	10	546
Wisconsin	1,427	59	3,246	1,046	708	118	195	8	947
Minnesota	466	58	1,199		668	27	156	22	266
Iowa	165	47	2,435	171	406	412	45	6	81
Missouri	548	239	727	256	645	448	269	19	219
North Dakota	117	14	134	292	124	71	27	11	97
South Dakota	153	24	618	47	127	280	8	2	55
Nebraska	201	79	2,036	156	354	163	82	0	103
Kansas	524	63	2,486	628	627	423	105	12	388
Delaware	44	15	45	1	56	0	[1] 12	4	14
Maryland	866	106	143	87	425	0	[1] 276	19	192
District of Columbia	114	64	40		71	0	121	0	37
Virginia	723	133	2,221		271	38	156	14	1,125
West Virginia	361	75	490		180	137	50	94	283
North Carolina	1,298	138	141		175	92		7	1,364
South Carolina	448	129	97	230	60	10	180	48	769
Georgia	330	44	1,018	324	103	7	101	23	175
Florida	384	30	1,388	492	31	1	24	7	79
Kentucky [2]									
Tennessee	305	72	1,329	207	404	122	333	36	204
Alabama	447	89	1,166	140	118	27	424	39	242
Mississippi	1,158	46	688	886	57	21	313	21	1,402
Arkansas	172	50	73	77	86	90	[1] 23	6	98
Louisiana	66	86	497	10	89	9	[1] 115	59	50
Oklahoma [3]	101	77	697	82	131	449	45	34	95
Texas [2]									
Montana	58	6	117	550	194	65	18	10	37
Idaho	68	5	375	84	44	59	9	6	31
Wyoming	18	7	46	49	41	35	[1] 1	0	18
Colorado	351	39	1,345	598	88	65	194	12	294
New Mexico	115	37	494	312	51	39	70	5	18
Arizona	64	28	95	304	81	130	148	7	69
Utah [2]									
Nevada	58		30	6		7	[1] 3		6
Washington	541	31	1,200	603	252	380	218	14	320
Oregon	255	35	339	341	179	101	74	3	165
California	2,537	245	7,822	3,467	825	410	1,064	30	779

[1] Pulmonary.
[2] Reports received weekly.
[3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 1,000 Population (Annual Basis) for the Month of March, 1930

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	8.65	0.18	4.13	6.04	8.54	0.00	0.71	0.16	2.55
New Hampshire	-------	.44	-------	-------	1.98	.00	-------	.03	-------
Vermont	7.62	.20	4.74	.67	1.64	.50	.63	.00	.87
Massachusetts	2.61	.76	10.19	2.74	3.14	.00	1.55	.02	4.03
Rhode Island	1.11	.91	.25	.03	1.72	.00	.53	.00	2.48
Connecticut	3.33	.58	.61	1.21	3.95	.00	.94	.04	1.34
New York	2.93	.61	3.68	2.84	2.58	.04	1.91	.09	1.98
New Jersey	3.97	1.55	9.53	-------	3.55	.00	1.32	.04	1.85
Pennsylvania	3.28	.70	5.67	2.00	2.48	.01	[1].71	.05	1.70
Ohio	3.61	.42	5.17	1.64	2.92	1.37	1.07	.06	1.34
Indiana	1.68	.39	1.80	.18	3.51	2.85	1.20	.04	.75
Illinois	2.17	1.03	4.28	1.51	8.89	.83	1.51	.04	1.29
Michigan	2.77	.71	10.40	2.07	3.62	.79	1.43	.02	1.34
Wisconsin	5.56	.23	12.64	4.07	2.76	.46	.76	.03	3.69
Minnesota	1.96	.24	5.05	-------	2.81	.11	.66	.09	1.12
Iowa	.80	.23	11.78	.83	1.96	1.99	.22	.03	.39
Missouri	1.82	.79	2.41	.85	2.14	1.49	.89	.06	.73
North Dakota	2.15	.26	2.46	5.36	2.28	1.30	.50	.20	1.78
South Dakota	2.50	.39	10.11	.77	2.08	4.58	.13	.03	.90
Nebraska	1.65	.65	16.74	1.28	2.91	1.34	.26	.00	.85
Kansas	3.34	.40	15.83	4.00	3.99	2.69	.67	.08	2.47
Delaware	2.11	.72	2.15	.05	2.68	.00	[1].57	.19	.67
Maryland	6.17	.75	1.02	.62	3.03	.00	[1] 1.96	.14	1.37
District of Columbia	2.31	1.29	.81	-------	1.44	.00	2.45	.00	.75
Virginia	3.23	.59	9.93	-------	1.21	.17	.70	.06	5.03
West Virginia	2.39	.50	3.24	-------	1.19	.91	.33	.62	1.87
North Carolina	5.06	.54	.55	-------	.68	.36	-------	.03	5.32
South Carolina	2.77	.80	.60	1.42	.37	.06	1.11	.30	4.76
Georgia	1.19	.16	3.67	1.17	.37	.03	.36	.08	.63
Florida	3.00	.23	10.84	3.84	.24	.01	.19	.05	.62
Kentucky [2]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Tennessee	1.42	.33	6.17	.96	1.88	.57	[1] 1.55	.17	.95
Alabama	2.01	.40	5.24	.63	.53	.12	1.90	.18	1.09
Mississippi	7.61	.30	4.52	5.83	.37	.14	2.06	.14	9.22
Arkansas	1.02	.30	.43	.46	.51	.53	[1].14	.04	.58
Louisiana	.39	.51	2.95	.06	.53	.05	[1].68	.35	.30
Oklahoma [3]	.54	.41	3.72	.44	.70	2.40	.24	.18	.51
Texas [2]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Montana	1.14	.13	2.51	11.80	4.16	1.89	.39	.21	.79
Idaho	1.30	.10	7.75	1.74	.91	1.22	.19	.12	.64
Wyoming	.82	.32	2.09	2.23	1.86	1.59	[1].05	.00	.59
Colorado	3.68	.41	14.11	6.28	.92	.68	2.04	.13	3.09
New Mexico	3.35	1.08	14.40	9.09	1.49	1.14	2.04	.15	.52
Arizona	1.50	.65	2.22	7.10	1.89	8.04	3.46	.16	1.61
Utah [2]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Nevada	.88	-------	.46	.09	-------	.11	[1].05	-------	.09
Washington	3.89	.22	8.63	4.34	1.81	2.73	1.53	.10	2.30
Oregon	3.24	.45	4.31	4.34	2.28	1.28	.94	.04	2.10
California	6.22	.60	19.18	8.50	2.02	1.01	2.61	.07	1.91

[1] Pulmonary.
[2] Reports received weekly.
[3] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,080,000. The estimated population of the 90 cities reporting deaths is more than 30,520,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended July 19, 1930, and July 20, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	638	885	
96 cities	301	444	491
Measles:			
45 States	2,958	3,095	
96 cities	930	595	
Meningococcus meningitis:			
46 States	90	131	
96 cities	30	47	
Poliomyelitis:			
46 States	196	67	
Scarlet fever:			
46 States	823	1,203	
96 cities	332	384	337
Smallpox:			
46 States	500	393	
96 cities	38	82	25
Typhoid fever:			
46 States	787	751	
96 cities	95	106	112
Deaths reported			
Influenza and pneumonia:			
90 cities	271	335	
Smallpox:			
90 cities	0	0	

City reports for week ended July 19, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	1	1	0		0	0	9	0
New Hampshire:								
Concord	0	0	0		0	0	0	0
Manchester	0	0	0		0	0	0	0
Nashua	0	0	0		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	0	0		0	0	0	0
Massachusetts:								
Boston	7	24	12	1	0	58	13	11
Fall River	0	2	0		0	7	5	0
Springfield	1	1	2		0	3	2	1
Worcester	5	1	0		0	24	0	1
Rhode Island:								
Pawtucket	0	1	1		0	0	0	0
Providence	4	3	0		0	7	0	0
Connecticut:								
Bridgeport	0	2	0		0	0	0	2
Hartford	3	2	0		0	4	0	0
New Haven	0	1	0		0	3	0	1
MIDDLE ATLANTIC								
New York:								
Buffalo	6	7	8		1	11	7	7
New York	35	134	55	3	2	268	35	70
Rochester	1	4	0		0	1	1	1
Syracuse	3	2	0		0	10	1	2
New Jersey:								
Camden	0	3	0		0	7	0	3
Newark	4	8	14		0	14	5	3
Trenton	2	1	0		0	1	0	2
Pennsylvania:								
Philadelphia	9	32	14		3	70	22	15
Pittsburgh	8	13	10		0	46	0	13
Reading	1	1	0		0	1	4	2
Scranton	0	2	0		0	0	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	2	3	2		0	16	4	1
Cleveland	49	17	6	1	0	3	12	10
Columbus	7	3	1	1	1	4	1	3
Toledo	9	3	1		0	1	5	4
Indiana:								
Fort Wayne	0	2	0		0	0	0	1
Indianapolis	8	2	2		0	5	2	0
South Bend	0	0	0		0	0	0	1
Terre Haute	0	0	0		0	5	0	2
Illinois:								
Chicago	44	59	74		1	13	36	26
Springfield	1	0	0		0	2	0	0
Michigan:								
Detroit	14	28	18	2	1	38	11	2
Flint	3	2	0		0	15	0	2
Grand Rapids	0	1	0		0	0	0	0

City reports for week ended July 19, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	6	0	0	----------	0	1	9	0
Madison	2	0	0	----------	----------	6	1	----------
Milwaukee	31	8	3	----------	0	10	9	3
Racine	7	1	0	----------	0	1	0	0
Superior	0	0	0	----------	0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	3	0	0	----------	0	0	0	0
Minneapolis	6	9	3	----------	0	0	2	1
St. Paul	23	4	3	----------	0	5	0	1
Iowa:								
Davenport	2	1	0	----------	----------	0	0	----------
Des Moines	0	1	0	----------	----------	0	0	----------
Sioux City	2	0	1	----------	----------	4	0	----------
Waterloo	1	0	0	----------	----------	0	1	----------
Missouri:								
Kansas City	1	2	0	----------	0	0	0	3
St. Joseph	0	0	1	----------	0	0	0	4
St. Louis	4	16	11	----------	----------	17	5	----------
North Dakota:								
Fargo	1	0	0	----------	0	1	4	0
Grand Forks	0	0	0	----------	----------	0	0	----------
South Dakota:								
Aberdeen	0	0	0	----------	----------	4	0	----------
Nebraska:								
Omaha	4	2	0	----------	0	1	0	2
Kansas:								
Topeka	3	1	1	1	0	1	3	1
Wichita	0	0	0	----------	0	1	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	1	0	----------	0	0	0	1
Maryland:								
Baltimore	12	10	8	----------	0	4	11	5
Cumberland	0	0	0	----------	0	2	0	0
Frederick	0	0	0	----------	0	0	0	0
District of Columbia:								
Washington	6	4	8	----------	0	27	0	2
Virginia:								
Lynchburg	2	0	0	----------	0	2	3	0
Norfolk	1	0	0	----------	0	0	0	2
Richmond	0	2	0	----------	0	9	0	2
Roanoke	0	0	0	----------	0	5	0	0
West Virginia:								
Charleston	0	0	0	----------	0	0	6	0
Wheeling	0	0	1	----------	0	1	0	0
North Carolina:								
Raleigh	0	0	0	----------	0	0	0	0
Wilmington	0	0	1	----------	0	0	0	0
Winston-Salem	0	0	0	----------	0	0	2	2
South Carolina:								
Charleston	0	0	0	2	0	0	0	2
Columbia	----------	0	----------	----------	----------	----------	----------	----------
Georgia:								
Atlanta	0	2	1	4	0	10	1	8
Brunswick	0	0	0	----------	0	0	0	0
Savannah	0	1	0	----------	0	0	0	2
Florida:								
Miami	0	1	3	----------	0	0	1	1
St. Petersburg	----------	0	----------	----------	0	----------	----------	0
Tampa	0	0	4	1	0	1	1	1

City reports for week ended July 19, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0	----------	0	1	0	0
Tennessee:								
Memphis	0	1	0	----------	0	1	0	3
Nashville	0	1	1	----------	0	1	0	2
Alabama:								
Birmingham	0	1	1	----------	0	4	0	3
Mobile	0	0	0	----------	0	0	0	0
Montgomery	0	0	0	1	----------	0	0	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	----------	0	----------	----------	----------	----------	----------	----------
Little Rock	0	0	0	----------	0	0	0	0
Louisiana:								
New Orleans	0	5	4	2	2	1	0	4
Shreveport	0	0	0	----------	0	0	1	1
Oklahoma:								
Tulsa	2	0	1	----------	----------	0	0	----------
Texas:								
Dallas	0	2	1	----------	0	2	0	2
Fort Worth	0	1	0	----------	0	0	0	2
Galveston	0	0	0	----------	0	0	0	0
Houston	0	2	3	----------	0	0	0	3
San Antonio	0	1	2	----------	1	0	1	3
MOUNTAIN								
Montana:								
Billings	0	0	0	----------	0	2	0	0
Great Falls	1	0	0	----------	0	0	0	0
Helena	0	0	0	----------	0	0	0	0
Missoula	0	0	0	----------	0	0	0	0
Idaho:								
Boise	0	0	0	----------	0	0	0	2
Colorado:								
Denver	4	7	8	----------	1	13	4	3
Pueblo	1	0	0	----------	0	8	7	0
New Mexico:								
Albuquerque	1	1	0	----------	0	0	1	0
Arizona:								
Phoenix	0	0	0	----------	0	1	0	1
Utah:								
Salt Lake City	8	2	0	----------	0	5	4	0
Nevada:								
Reno	0	0	0	----------	0	0	0	1
PACIFIC								
Washington:								
Seattle	8	2	1	----------	----------	39	34	----------
Spokane	3	0	0	----------	----------	12	3	----------
Tacoma	1	2	3	----------	0	14	0	0
Oregon:								
Portland	23	4	0	----------	0	6	4	4
Salem	0	1	0	----------	0	0	0	0
California:								
Los Angeles	15	31	7	12	1	71	39	0
Sacramento	0	2	1	----------	0	7	1	2
San Francisco	7	9	4	1	1	10	11	4

City reports for week ended July 19, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	0	0	0	0	0	0	0	0	0	5	13
New Hampshire:											
Concord	0	0	0	0	0	1	0	0	0	0	12
Manchester	0	0	0	0	0	0	0	0	0	0	4
Nashua	0	0	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	4
Burlington	0	0	0	0	0	0	0	0	0	0	8
Massachusetts:											
Boston	21	16	0	0	0	8	2	2	0	55	146
Fall River	1	4	0	0	0	2	0	1	0	0	20
Springfield	1	1	0	0	0	0	0	0	0	1	26
Worcester	2	2	0	0	0	1	1	0	0	15	37
Rhode Island:											
Pawtucket	1	1	0	0	0	0	0	0	0	0	6
Providence	3	1	0	0	0	4	0	0	0	18	54
Connecticut:											
Bridgeport	2	1	0	0	0	1	0	1	0	0	37
Hartford	2	1	0	0	0	0	0	0	0	0	26
New Haven	1	0	0	0	0	2	0	0	0	3	28
MIDDLE ATLANTIC											
New York:											
Buffalo	7	8	0	0	0	8	0	0	1	49	119
New York	44	22	0	0	0	86	20	3	1	125	1,219
Rochester	2	8	0	0	0	2	0	0	0	3	59
Syracuse	2	2	0	0	0	2	0	1	0	23	30
New Jersey:											
Camden	1	0	0	0	0	2	0	0	0	0	28
Newark	6	4	0	0	0	9	0	0	0	25	81
Trenton	0	0	1	0	0	3	1	0	0	2	25
Pennsylvania:											
Philadelphia	23	25	0	0	0	36	4	3	0	24	382
Pittsburgh	11	8	0	0	0	10	3	1	0	34	148
Reading	0	1	0	0	0	2	0	0	0	6	26
Scranton	1	2	0	0	0	0	0	0	0	4	--------
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	5	5	1	0	0	5	1	0	0	2	118
Cleveland	14	16	0	0	0	11	2	3	0	53	159
Columbus	2	3	0	0	0	4	1	0	0	7	71
Toledo	3	2	1	1	0	1	1	1	0	3	49
Indiana:											
Fort Wayne	0	0	0	1	0	0	1	1	0	0	18
Indianapolis	2	2	2	8	0	0	0	3	0	13	--------
South Bend	0	0	0	0	0	2	0	0	0	0	23
Terre Haute	1	0	0	2	0	0	0	0	0	0	14
Illinois:											
Chicago	88	57	1	1	0	43	4	8	0	80	572
Springfield	0	0	0	0	0	1	0	1	0	3	19
Michigan:											
Detroit	31	28	2	1	0	36	3	1	0	120	261
Flint	4	6	1	2	0	3	0	1	0	4	20
Grand Rapids	4	4	1	1	0	0	0	0	0	5	26
Wisconsin:											
Kenosha	0	0	0	0	0	0	0	0	0	13	5
Madison	1	0	0	1	--------	--------	0	0	--------	15	--------
Milwaukee	7	13	0	0	0	8	0	1	0	61	87
Racine	2	5	0	0	0	0	0	0	0	10	11
Superior	2	0	1	0	0	0	0	0	0	0	13
WEST NORTH CENTRAL											
Minnesota:											
Duluth	3	2	0	0	0	1	0	0	0	11	17
Minneapolis	12	1	1	0	0	2	1	4	0	1	95
St. Paul	7	5	0	0	0	5	0	0	0	9	56
Iowa:											
Davenport	0	0	1	8	--------	--------	0	0	--------	0	--------
Des Moines	2	0	0	13	--------	--------	0	0	--------	0	32
Sioux City	0	0	0	1	--------	--------	0	0	--------	4	--------
Waterloo	1	0	0	0	--------	--------	0	0	--------	3	--------

City reports for week ended July 19, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—continued											
Missouri:											
Kansas City	2	4	0	1	0	5	1	1	0	1	109
St. Joseph	0	4	1	0	0	1	0	0	0	0	30
St. Louis	7	3	1	0	0	15	4	7	0	8	442
North Dakota:											
Fargo	0	0	0	0	0	1	0	0	0	2	8
Grand Forks	0	0	0	2	-------	-------	0	0	-------	0	-------
South Dakota:											
Aberdeen	0	0	0	0	-------	-------	0	0	-------	0	-------
Nebraska:											
Omaha	1	0	0	3	0	1	0	0	0	0	84
Kansas:											
Topeka	1	3	1	0	0	0	0	0	0	20	15
Wichita	1	0	0	2	0	1	0	0	0	1	26
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	1	0	0	0	0	0	0	0	1	25
Maryland:											
Baltimore	7	7	0	0	0	11	5	9	0	43	168
Cumberland	0	0	0	0	0	0	1	0	0	0	8
Frederick	0	0	0	0	0	0	0	0	0	0	-------
District of Col.:											
Washington	4	5	0	0	0	13	3	2	1	12	119
Virginia:											
Lynchburg	0	0	0	0	0	0	1	2	0	13	12
Norfolk	0	0	0	0	0	1	1	0	0	0	-------
Richmond	1	4	0	0	0	1	1	0	0	1	38
Roanoke	1	0	0	0	0	0	1	1	0	1	12
West Virginia:											
Charleston	0	1	0	0	0	0	2	1	0	16	18
Wheeling	1	2	0	0	0	0	0	0	0	2	15
North Carolina:											
Raleigh	0	0	0	2	0	3	1	0	0	0	19
Wilmington	0	0	0	0	0	0	0	1	0	3	9
Winston-Salem	1	0	1	0	0	2	1	0	0	13	12
South Carolina:											
Charleston	0	0	0	0	0	0	1	0	0	0	20
Columbia	0	-------	0	-------	-------	-------	1	-------	-------	-------	-------
Georgia:											
Atlanta	2	3	0	0	0	3	3	2	1	48	87
Brunswick	0	0	0	0	0	0	0	0	0	0	3
Savannah	0	0	0	0	0	4	1	2	0	0	24
Florida:											
Miami	1	0	0	0	0	2	0	0	0	0	26
St. Petersburg	0	-------	0	-------	0	0	0	-------	0	-------	4
Tampa	0	1	0	0	-------	2	0	0	0	0	23
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	0	0	0	0	1	0	0	0	0	12
Tennessee:											
Memphis	1	1	0	0	0	7	8	3	0	0	138
Nashville	1	0	0	0	0	5	5	5	0	1	53
Alabama:											
Birmingham	0	2	0	0	0	6	4	2	1	3	92
Mobile	0	0	0	0	0	4	0	0	0	0	26
Montgomery	0	0	0	0	-------	-------	2	0	-------	0	-------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Little Rock	0	0	0	0	0	1	2	0	0	0	-------
Louisiana:											
New Orleans	3	1	0	0	0	10	4	2	1	9	128
Shreveport	0	0	0	0	0	2	3	1	1	0	35
Oklahoma:											
Tulsa	1	1	0	3	-------	-------	2	0	-------	1	-------

City reports for week ended July 19, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL—contd.											
Texas:											
Dallas	1	1	0	0	0	1	3	1	0	0	57
Fort Worth	1	0	0	0	0	1	2	0	0	0	23
Galveston	0	0	0	0	0	1	0	2	0	0	8
Houston	1	3	0	2	0	3	1	7	0	0	68
San Antonio	0	1	0	0	0	4	1	3	0	0	57
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	1	0	0	0	0	10
Great Falls	1	1	1	0	0	0	0	0	0	0	7
Helena	0	0	0	0	0	0	0	0	0	10	6
Missoula	0	0	1	2	0	0	0	2	0	0	1
Idaho:											
Boise	0	0	1	0	0	0	0	0	0	2	7
Colorado:											
Denver	4	8	0	0	0	8	2	0	0	43	80
Pueblo	1	0	1	0	0	0	2	0	1	4	9
New Mexico:											
Albuquerque	0	0	0	0	0	3	0	0	0	0	8
Arizona:											
Phoenix	0	0	0	0	0	1	0	2	0	0	12
Utah:											
Salt Lake City	2	0	0	0	0	1	0	1	0	45	29
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	3	1	1	1			1	0		25	
Spokane	0	0	1	4			0	0		12	
Tacoma	1	1	2	0	0	0	0	2	0	2	15
Oregon:											
Portland	1	1	6	5	0	3	0	1	0	3	73
Salem	0	0	1	0	0	0	0	0	0	1	
California:											
Los Angeles	17	14	1	0	0	34	2	3	1	34	318
Sacramento	1	4	0	3	0	0	1	2	0	0	22
San Francisco	5	4	1	1	0	9	1	1	0	1	152

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Massachusetts:									
Boston	0	0	0	0	0	0	0	3	0
Worcester	1	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	1	0	0	0	0	0	0	3	1
New York City	5	4	3	1	0	0	8	1	0
Syracuse	0	0	0	0	0	0	1	4	1
New Jersey:									
Newark	0	0	1	0	0	0	1	1	0
Pennsylvania:									
Philadelphia	2	0	0	0	0	1	1	3	0
Pittsburgh [1]	1	0	0	0	0	0	1	1	1

[1] Rabies (in man): 1 death at Pittsburgh, Pa.

City reports for week ended July 19, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	1	0	0	0	0	0	1	0
Cleveland	0	0	0	0	0	1	0	0	0
Columbus	0	0	1	1	0	0	0	0	0
Toledo	0	1	0	0	0	0	0	0	0
Indiana:									
Indianapolis	1	0	0	0	0	0	0	1	0
Illinois:									
Chicago	3	1	1	2	0	0	1	0	0
Springfield	0	0	0	0	0	0	0	2	0
Michigan:									
Detroit	2	5	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	1	0	0	0	0	0	0	0
Missouri:									
St. Joseph	1	0	0	0	0	0	0	0	0
St. Louis	4	1	0	0	0	0	0	0	0
North Dakota:									
Grand Forks	1	0	0	0	0	0	0	0	0
Kansas:									
Topeka	1	0	0	0	0	0	0	0	0
Wichita	0	0	0	0	0	0	0	0	1
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	0	0	0	0	1	1	0	0
Virginia:									
Lynchburg	0	0	0	0	0	1	0	0	0
Norfolk	0	0	0	0	0	0	0	2	0
West Virginia:									
Charleston	1	1	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	3	0	0	0	0
Winston-Salem	0	0	0	0	10	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	11	1	0	0	0
Georgia:									
Atlanta	0	0	0	0	1	1	0	0	0
Savannah	0	0	0	0	1	0	0	0	0
Florida:									
Tampa	0	0	0	0	0	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	3	1	0	0	1	0	0	0	0
Alabama:									
Birmingham	0	0	0	0	1	1	1	0	0
Montgomery	0	0	0	0	2	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	2	3	0	0	0
Shreveport	0	0	0	1	0	1	0	2	0
Texas:									
Dallas	0	0	0	0	2	0	0	0	0
Houston [1]	0	0	0	0	0	1	0	1	0
MOUNTAIN									
Montana:									
Great Falls	2	0	0	0	0	0	0	0	0
Utah:									
Salt Lake City	1	0	0	0	0	0	0	0	0
PACIFIC									
Oregon:									
Portland	2	1	1	0	0	0	0	2	0
California:									
Los Angeles	0	1	0	0	0	0	1	31	3
San Francisco	0	0	0	0	1	0	0	1	0

[1] Typhus fever: 1 case at Houston, Tex.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended July 19, 1930, compared with those for a like period ended July 20, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, June 15 to July 19, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929
98 cities	68	112	67	110	59	89	59	88	[2] 49	73
New England	35	74	62	94	51	70	38	79	33	83
Middle Atlantic	81	125	65	144	59	101	52	99	48	76
East North Central	93	165	98	131	91	128	87	119	66	105
West North Central	34	87	70	85	36	77	66	69	38	54
South Atlantic	33	64	24	34	24	34	29	43	[3] 43	30
East South Central	13	34	13	34	40	27	27	41	13	27
West South Central	86	65	37	69	52	72	64	84	[4] 38	69
Mountain	9	26	0	26	9	26	26	26	69	17
Pacific	54	58	64	84	38	43	61	41	38	41

MEASLES CASE RATES

	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929
98 cities	656	423	500	267	276	195	257	150	[2] 151	98
New England	1,048	391	762	211	498	209	421	186	285	146
Middle Atlantic	818	123	640	99	339	76	322	51	205	47
East North Central	381	1,010	334	620	170	474	155	351	71	210
West North Central	658	504	264	256	137	114	127	104	57	52
South Atlantic	375	129	234	137	165	73	130	49	[3] 114	43
East South Central	270	41	256	7	142	27	202	14	47	7
West South Central	82	183	19	156	26	69	19	61	[4] 11	4
Mountain	2,617	218	1,416	148	712	148	566	104	240	61
Pacific	1,247	352	931	208	527	138	562	152	361	109

SCARLET FEVER CASE RATES

	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929
98 cities	145	148	109	112	77	88	72	83	[2] 54	64
New England	115	159	124	119	66	90	66	83	60	56
Middle Atlantic	118	100	89	72	57	46	51	41	37	35
East North Central	229	260	184	191	116	173	115	160	87	103
West North Central	148	77	97	104	102	38	83	79	42	54
South Atlantic	97	73	62	62	57	60	62	64	[3] 45	69
East South Central	67	89	61	34	13	55	47	48	20	55
West South Central	105	88	41	42	49	23	37	42	[4] 23	72
Mountain	197	96	60	70	163	44	86	35	77	78
Pacific	85	210	57	164	45	135	50	89	57	65

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1930, and 1929, respectively.
[2] Columbia, S. C., and Fort Smith, Ark., not included.
[3] Columbia, S. C., not included.
[4] Fort Smith, Ark., not included.

Summary of weekly reports from cities, June 15 to July 19, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

SMALLPOX CASE RATES

	Week ended—									
	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929
98 cities	10	9	13	15	7	15	7	8	[2] 6	13
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	8	18	10	38	5	41	9	19	10	32
West North Central	30	6	51	19	13	13	9	15	13	21
South Atlantic	2	6	9	2	2	2	0	2	[3] 4	2
East South Atlantic	20	0	7	7	20	21	20	7	0	7
West South Central	26	4	22	4	0	11	7	15	[4] 8	0
Mountain	34	61	51	113	51	35	9	35	17	44
Pacific	43	31	50	14	38	24	43	10	21	34

TYPHOID FEVER CASE RATES

	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929
98 cities	8	8	13	12	10	10	16	14	[2] 15	18
New England	0	4	9	9	7	4	4	4	9	9
Middle Atlantic	4	2	5	7	6	6	10	7	4	10
East North Central	3	4	10	3	1	4	6	7	9	8
West North Central	8	19	13	15	8	13	9	10	23	19
South Atlantic	22	13	37	30	26	32	55	7	[3] 37	32
East South Central	54	55	67	34	94	48	94	157	67	144
West South Central	26	34	34	34	49	8	37	84	[4] 61	57
Mountain	9	9	34	52	0	17	0	9	26	52
Pacific	7	5	5	19	5	7	17	2	19	5

INFLUENZA DEATH RATES

	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929
91 cities	4	6	3	5	4	2	4	3	[3] 3	3
New England	2	2	0	2	2	0	0	2	0	0
Middle Atlantic	5	3	2	4	4	3	4	2	3	2
East North Central	4	8	3	4	2	1	3	3	2	3
West North Central	0	6	0	0	0	0	6	0	0	3
South Atlantic	2	6	5	4	5	2	2	4	[3] 0	6
East South Central	15	15	15	15	7	15	15	7	0	0
West South Central	8	16	11	4	15	4	8	4	11	20
Mountain	0	0	0	44	0	0	0	26	9	0
Pacific	0	6	3	3	9	0	3	0	6	3

PNEUMONIA DEATH RATES

	June 21, 1930	June 22, 1929	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929
91 cities	74	81	68	64	55	63	54	55	[3] 44	55
New England	69	56	49	58	29	49	40	29	35	70
Middle Atlantic	82	89	75	65	58	67	57	62	56	65
East North Central	53	76	56	69	41	56	38	50	32	40
West North Central	109	48	86	48	62	63	74	51	38	36
South Atlantic	64	84	66	62	55	69	55	58	[3] 47	54
East South Central	133	119	103	75	162	75	81	30	59	52
West South Central	69	82	92	66	84	109	84	82	50	27
Mountain	129	78	77	104	60	61	103	44	51	96
Pacific	74	104	55	38	64	31	61	53	18	63

[2] Columbia, S. C., and Fort Smith, Ark., not included.
[3] Columbia, S. C., not included.
[4] Fort Smith, Ark., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended July 19, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended July 19, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia						2
New Brunswick						1
Quebec	2			1		11
Ontario	1	1		3	6	11
Manitoba			1			1
Saskatchewan				3		2
Alberta				1	1	
British Columbia		5				1
Total	3	6	1	8	7	29

[1] No disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended July 19, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended July 19, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	2	Mumps	26
Chicken pox	21	Ophthalmia neonatorum	1
Diphtheria	29	Poliomyelitis	1
Erysipelas	7	Scarlet fever	41
German measles	3	Tuberculosis	61
Influenza	2	Typhoid fever	11
Measles	34	Whooping cough	38

CHINA

Meningitis.—During the week ended July 5, 1930, eight cases of meningitis, with five deaths were reported at Canton, China. Five cases and three deaths were reported during the two weeks ended July 19.

CZECHOSLOVAKIA

Communicable diseases—May, 1930.—During the month of May, 1930, communicable diseases were reported in Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	6	1	Puerperal fever	63	26
Cerebrospinal meningitis	13	5	Scarlet fever	1,679	34
Diphtheria	1,543	80	Trachoma	358	
Dysentery	17	4	Typhoid fever	428	29
Malaria	48		Typhus fever	12	
Paratyphoid fever	11	2			

MEXICO

Vera Cruz—Deaths from certain diseases—Six weeks ended July 12, 1930.—During the six weeks ended July 12, 1930, deaths from certain diseases were reported in Vera Cruz, Mexico, as follows:

Disease	Week ended—						
	June 7	June 14	June 21	June 28	July 5	July 12	Total
Bronchitis	2	2	3		2	1	10
Cancer	1		1		1	1	4
Cerebrospinal meningitis			2		1	1	4
Diphtheria		1					1
Dysentery				1			1
Gastro-intestinal disorders	10	11	14	17	11	13	76
Hookworm disease					2		2
Influenza	1						1
Malaria		4	1				5
Pneumonia	5	4	4	3	5	10	31
Tuberculosis	4	6	4	1	6	9	30
Typhoid fever	2	2	2	1		2	9

PHILIPPINE ISLANDS

Cholera—May to July, 1930.—A report dated June 26, 1930, from the chief quarantine officer of the Philippine Islands, gives the following information relative to the occurrence of cholera in the Philippine Islands:

On or about May 21, 1930, suspicious cases of gastro-intestinal disease began to occur in the vicinity of the town of Cadiz, which is not far from the northeast coast of the island of Negros. The clinical findings were those of cholera, but not until a considerable time after the occurrence of the first cases was it possible to ascertain definitely that the disease was actually cholera.

The disease soon appeared at points some distance from Cadiz, particularly on the island of Bantayan, which is in the strait northeast of Negros and northwest of Cebu, but belongs to the Province of Cebu. On this island eight small villages had become infected by June 26, and on June 3, 1930, one case was carried from Bantayan to

the port of Cebu, dying in a small boat immediately before arrival there. An autopsy showed that the disease was cholera. All contacts were quarantined at the Cebu Quarantine Station, but were released after three separate bacteriological examinations.

Later reports show that there were about 1,700 cases of cholera with approximately 850 deaths in the Philippine Islands from the beginning of the outbreak to July 26, 1930.

The Philippine Health Service is taking measures to check the spread of the disease.

SCOTLAND

Aberdeen—Smallpox.—During the week ended July 12, 1930, a death from smallpox occurred at Aberdeen, Scotland. The registrar general of Scotland states that this is the first death from smallpox in Scotland since 1921.

VIRGIN ISLANDS

Communicable diseases—May, 1930.—During the month of May, 1930, cases of certain communicable diseases were reported in the Virgin Islands as follows:

St. Thomas and St. John:		St. Croix:	
Chancroid	1	Gonorrhea	1
Gonorrhea	4	Syphilis	11
Syphilis	9	Tuberculosis	1
Tuberculosis	2	Uncinariasis	5

YUGOSLAVIA

Communicable diseases—June, 1930.—During the month of June, 1930, certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	33	3	Puerperal septicemia	1	1
Cerebrospinal meningitis	11	5	Scarlet fever	931	129
Diphtheria	361	48	Smallpox	1	
Dysentery	37	4	Tetanus	43	26
Erysipelas	176	7	Typhoid fever	212	16
Glanders	1	1	Typhus fever	6	
Measles	1,515	16			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19	26
Afghanistan	C														[1] P		
China:																	
Canton	C						1	1	1		2				2		
Manchuria—Dairen	C		1														
Swatow	C								3	4	3						
India	C	6,461	5,914	10,817	41,462	15,596	14,600	12,468	13,647								
	D	3,606	3,371	5,866	27,906	12,782	11,882	9,756	10,458								
Bassein	C				7	3	4										
	D				5	3	2										
Bombay	C			4													
Calcutta	C	202	269	354	647	194	175	142	98	78	73	94	77	81	53		
	D	110	153	220	414	125	107	83	57	44	36	36	63	54	28		
Negapatam	C	12									1						
	D	4									1						
Rangoon	C	3	3	2	1		5	2	2	1	1	2	2	1			
	D	3	1	2	1		1		2	1	1	1	1	1			
Tuticorin	C	3															
	D	1															
India (French):																	
Chandernagor	C		4	1	6	2	2	2				1	2				
	D		2	3	5	1	4	1				1	1				
Karikal	C		4	12	1								3				
	D		1	9	1								3				
Indo-China (see also table below):																	
Pnompenh	C	11	9		2	1				5	10	11	14	9	16		
	D	8	7	6			2	2	1	1	4	7	6	6	9		
Saigon and Cholon	C	2	5	14	76	59	40	48	13	17	19	7	5	7	1		
	D	2	4	6	55	43	27	24	7	11	10	2		3			

Philippine Islands:																	
Bulacan Province—																	
Malolos	C									1			1				1
	D									1							
Obando	C																2
Santa Maria	C												1				
Capiz Province—																	
Capiz	C																2
	D																1
Paniten	C																1
	D																1
Cebu Province—																	
Bantayan	C									3	10	86	86	134	94	67	30
	D									3	9	39	43	8	41	36	16
Barili	C												1	1			
	D													1			
Bogo	C										1	3	1	23	21	6	11
	D										1	1	1	11	9	4	8
Borbon	C																1
	D																1
Cebu	C												20	14	13	13	9
	D												9	6	7	12	8
Madridejos	C												15	13	3	1	
	D												8	5	1	1	
Medellin	C												1	18	38	6	2
	D													6	9	3	1
Opon	C															11	
	D															1	
San Remigio	C											3	8	38	23	12	3
	D											2	4	8	5	2	1
Sante Fe	C									1							
	D									1							
Tobogon	C														13	1	
	D														6	2	
Iloilo Province—																	
Akuy	C															9	
	D															4	
Ajux	C																4
	D																3
Concepcion	C															1	
Iloilo port	C														1	11	17
	D															9	13
Jaro	C															4	4
	D															3	2
La Paz	C														2	7	24
	D														3	5	8
Lumbeno	C															1	
	D															1	
Miagao	C												1	1		17	8
	D													2		11	5

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930 10	17	24	31	June, 1930 7	14	21	28	July, 1930 5	12	19	26
Philippine Islands—Continued.																	
Iloilo Province—Continued.																	
Ottro	C																3
	D																2
Paist	C															1	
Pavia	C															1	
San Miguel	C															24	5
	D															19	5
Santa Barbara	C															1	1
	D															1	1
Tigbauan	C															1	
	D															1	
La Union Province—Rosario	C														1		
Leyte Province—Maripipi	C										1	15	20				
	D											11	9				
Manila	C							1									
Masbate Province—																	
Catalngan	C												10	20	21	8	
	D												3	4	14	2	
Catbabayn	C														4		20
	D														1		4
Misami Province—San Miguel	C														2		
	D														2		
Neuva Ecija Province—																	
San Leonardo	C																1
	D																1
Occidental Negros Province—																	
Bacolod	C											9			4	13	13
	D											8			4	9	9
Bago	C															2	8
	D															1	5
Binalbagan	C														9	11	22
	D														3	3	9
Cadiz	C								10	2	10	10	3	3	1	7	2
	D								7	1	3	5	3	4	1	5	2
Calatrava	C											3			1		
	D											2			1		

Cauyan	C															1	
	D															1	
Escalante	C									1					22	12	1
	D									1					7	10	3
Guiyhulgan	C															6	
	D															3	
Himalayan	C																14
	D																5
Hinigaran	C															16	6
	D															11	6
Isabela	C														11	13	21
	D															3	5
La Carlota	C												3	1		2	2
	D												1	1		1	1
La Castellana	C												4	3	5	6	4
	D												2	3	3	3	3
Manapla	C															3	
	D															2	
Mariagla	C															1	
	D															1	
Murcia	C															1	1
	D														3		1
Pinamalayan	C															16	
	D															13	
Polupandan	C														1		1
	D														1		1
Pontevada	C														7	13	9
	D														3	14	4
Puludan	C														1	3	
	D														1	3	
Sagay	C															10	10
	D													1		6	6
San Antonio	C										1						
	D										1						
San Carlos	C														6	5	4
	D														3	1	4
San Enrique	C														5	19	5
	D														3	12	6
Saravia	D															4	1
Silay	C														6	11	11
	D														6	10	5
Talisay	C											7	4		6	11	3
	D											7	1		4	7	4
Valladolid	C														3	13	24
	D														4	12	22
Oriental Negros Province—																	
Guishlnag	C																9
	D																5
Pavia	C																5
	D																2
Vallehermosa	C																3
	D														1		2

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930				June, 1930				July, 1930			
						10	17	24	31	7	14	21	28	5	12	19	26
Philippine Islands—Continued.																	
Pampanga Province—																	
Angeles	C												1				
Bacolor	C												1				
Lubao	C													2			
Pangasinan Province—																	
Binmaley	C													2			
Urdantea	C															1	
Rizal Province—Navotas	C								1								
	D								1								
Siam	C	3	7	1	29	12	4	13	4			6					
	D		4		13	10	2	7	2			4					
Bangkok	C	3	2	2	15			6	3	5	3	3	1		3		
	D			1	4			2	1		3		2		1		
Nagara Pathom	C		1		10												
	D		1		2												
Songkla	C														8		
	D														4		
On vessel:																	
S. S. at Suva, Fiji Islands	C		1														
S. S. Sutley, at Batavia, from Calcutta	C		1														
S. S. Sassari, at Massoua, from Jeddah	C								1								
	D								1								
On small boat at Port Cebu, from Bantayan Island	C									1							
	D									1							

Place		December, 1929	January, 1930	February, 1930	March, 1930			April, 1930			May, 1930			June, 1930	
					1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20
Indo-China (French) (see also table above):															
Annam [1]	C		1	4		52				60		20	3	2	14
Cambodia [1]	C	41	147	90	49	32		18	6		5	31	52	56	88
Cochin-China [1]	C	46	177	65	5	22	55	48			188	224	259	147	126

[1] Reports incomplete.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930 10	17	24	31	June, 1930 7	14	21	28	July, 1930 5	12	19	26
Algeria:																	
Algiers	C														1	2	
Constantine	C									1				1			
Argentina:																	
Andalgala [1]																	
Rosario	C	P															
Santa Fe	C	6															
Villa Lia	D		2														
Azores: Ponta Delgada	C				8												
	D				5												
Belgian Congo	C													2			
	D													2			
Brazil:																	
Rio de Janeiro	C	1															
	D	1															
Sao Paulo. [2]																	
British East Africa (see also table below):																	
Tanganyika	C		7		44												
	D				20												
Uganda	C	82	47	98	117	54	89		84	121							
	D	70	43	87	105	48	75		72	75							
Ceylon:																	
Colombo	C	4	3	4	1	4	1		1	1				1	2		
	D	4	3	4	1	3	1		1	1				1	2		
Plague-infected rats		1	3	2	4					1							
Chile: Antofagasta	C	1	1	1	1												
	D			2	1												
Dutch East Indies:																	
Batavia and West Java	C	167	153	124	87	18	33	17	14	19	27						
	D	164	150	122	81	18	33	17	14	19	27						
Plague-infected rats		3	3	3	8			3	2	3	1						
~~Celebes~~—Makassar	C	1															
	D	1															
Java and Madura	D	317	296	223	173	28	74	36	48	40							
Ecuador (see table below).																	

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.

[2] 21 cases of plague with 8 deaths were reported Jan. 29, 1930, in the State of Sao Paulo, Brazil; 15 of these cases were in the city of Sao Paulo.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930 10	May, 1930 17	May, 1930 24	May, 1930 31	June, 1930 7	June, 1930 14	June, 1930 21	June, 1930 28	July, 1930 5	July, 1930 12	July, 1930 19	July, 1930 26
Egypt:																	
Alexandria	C	4	1	4	2	2	3	3	5	3	6	6	4	8	8	3	4
	D	1		1	2			1	2	2		2	5	2	3	2	3
Assiout	C				14	3	9	2	6	4	2	3		1	1		
	D				5		3	1	1		1		2	1	1		
Beheira	C	2		4													
Beni Suef	C			4													
Dakahlieh	C		8	5	5	3	1	2	5	1							
	D			1			1	1									
Gharbieh	C	1			1												
	D				1												
Girga	C				1										1		
Minieh	C							6	1	1	1	4	4	2	1		
	D								1		1						
Port Said	C				1		1	1		1			1				1
France: St. Ouen	C															1	
	D															1	
Greece (see also table below):																	
Patras	C			1								1					
Piraeus	C	1															
Pyrgos	C			1													
Hawaii Territory, Hamaqua, Hawaii: Plague-infected rats												1					
India	C	4,814	5,639	4,087	2,215	281	188	117	62								
	D	3,308	3,940	3,344	1,960	271	205	103	56								
Bassein	C	1		3													
	D	1		1													
Bombay	C	1	1	7	4	4	1		1	1		2					
	D	1	1	5	8	1	4					1	1				
Plague-infected rats		28	31	86	108	23	39		19	6	7	8	5	13	14		
Madras Presidency	C	27	230	157	44	2		6	30	26		2			1		
	D	13	140	87	19		1	4	6	15					1		
Rangoon	C	3	7	3	5		1	3					1				
	D	2	6	3	4	1	1	1					1				
Plague-infected rats		1	7	3	4	1	3	1				1		2	2		
India (Portuguese)	D					7											

Indo-China (see also table below):																	
Pnompenh	C	1			3	1			2	6					1		
	D	2	13	13	4			1		5	1		1				
Saigon and Cholon	C	2		1		1				1		1					
	D	2		1								1					
Iraq: Baghdad	C	6	6	7	6	7	11	7	12	12	4	8	4	10	4	2	2
	D	2	1	4	2	3	5	4	6	7	3	5		5		1	1
Japan: Osaka (vicinity of)—Plague-infected rats		7	6	4	3												
Kwang-Chow-Wan	C	25	25	7	37		20		14	23		8					
Madagascar (see also table below): Tamatave	C				1					1							
Morocco	C	4	48	55	121	19	22	18	12	2		1					
	D		13	18	45	11	14	6	3	4							
Nigeria: Lagos	C	6	7	13		1	1			1		3	1	1			
	D	6	7	5		1	1			1		3	1	1			
Plague-infected rats		44	42	25	7	2	6	5	4	1							
Senegal (see table below).																	
Siam	C	8	17	16	5		1	1	3								
	D	6	13	15	6		1		3								
Bangkok	C		1	5			1	1	3								
	D		1	4			1		3								
Nagara Pathom	C	7	5	1	10												
	D	7	6	1	9												
Nagara Rajsima	C	2	2	1	1												
	D			1	1												
Syria: Beirut	C										2	1	1		2	4	3
Tunisia:																	
Sfax district	C	18	22		1	17			4	6		3					
Tunis	C	6	5	1	4				1		1				1		
	D									1					1		
Union of Socialist Soviet Republics:																	
Salsk Region	C									1			1				
	D									1							
Stavropol Region	C									1							
	D									1							
Union of South Africa:																	
Cape Province	C	1	2	1		P				1							
	D		1	1													
Orange Free State	C	15	11	5	1												
	D	9	3	3													
Transvaal	C	8	2	1													
	D	3		1													
On vessel:																	
At Rio de Janeiro, Brazil, from Argentina	C	1															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
British East Africa (see also table above):							
Kenya	C	34	69	85	16	171	75
Uganda	C	184	109				
	D	155	90				
Ecuador: Guayaquil	C	4	2	2	0		
	D	2	2		0		
Plague-infected rats		4	2	2	0		
Ecuador (outside of Guayaquil)	C	4					
	D	2					
Greece (see also table above)	C				1		1
Indo-China (see also table above)	C	10	30	27	4		11
Madagascar (see also table above)	C	282					
	D	258					
Ambositra Province	C	128	49	25	14		
	D	111	41	20	12		
Antisirabe Province	C	26	22	38	46		
	D	25	22	36	45		
Itasy Province	C	31		4			
	D	31		4			
Miarinarivo Province	C		25	14	1		
	D		25	14	1		
Madagascar (see also table above)—Con.							
Moramanga Province	C	22	7	5	3		
	D	21	4	5	3		
Tamatave Province	C	3					
	D	1					
Tananarive Province	C	88	110	52	39		
	D	83	107	52	38		
Senegal:							
Baol [1]	C			18	24	13	2
	D			8	12	11	2
Dakar [1]	C				2	52	53
	D				2	42	117
Louga [1]	C		2		33	54	60
	D				10	27	21
Thies [1]	C	3		3	12	21	52
	D			2	9	8	35
Tivaouane [1]	C	1		11	71	135	43
	D			8	38	69	28

[1] Incomplete reports.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Jan. 12-Feb. 8, 1930	Feb. 9-Mar. 8, 1930	Mar. 9-Apr. 5, 1930	Apr. 6-May 3, 1930	Week ended— May, 1930: 10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19	26
Algeria:																	
Algiers	C	6	1	5	1		1		2								
Constantine	C	1										1					
Oran	C	5		1													
Arabia: Aden	C	1	2	3	1									1			
Bolivia: La Paz.[1]																	
Belgian Congo (see table below).																	
British Borneo. Sarawak	C	4	19														
British East Africa (see also table below):																	
Tanganyika	C	5	49	103	57	33	45	55	276	385	755						
	D		8	7	14	3	5	8	54	154	90						
British South Africa:																	
Northern Rhodesia	C			9	1			57	2								
	D				2			9									
Southern Rhodesia	C	1	6		66	53		42	60	75	1						
	D				1	4		8	1								
Canada:																	
Alberta	C	22	4	10	4										2	1	
Edmonton	C	19	1	4	3												
British Columbia—Vancouver	C	16	16	20	17			2	2	1	1			2	2		
Manitoba	C	6	2	4	4			7	3			4					
Ontario	C	63	86	100	77	14	24	24	20	14	10	13	10	3	5	6	
Fort William	C	4															
North Bay	C	2	1			1											
Ottawa	C	10	11	19	21	3	10	7	5	6		8	1	1	1	4	7
Toronto	C	2						3	1	2	1	1			1		
Quebec	C	11											4	3			
Montreal	C	1															
Saskatchewan	C	86	76	47	41	20	6	10	3		12	10			2		
Regina	C					1		3									
Ceylon:																	
Angoda, Western Province	C		10		6												
	D		1		2												
Colombo	C	1	3														
	D		2														

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19	26
China:																	
Canton	C	7	11	6	3					1							
	D	2	3	2	3												
Chungking	C	P	P		P	P		P	P	P			P				
Foochow	C	P	P		P		P		P		P		P				
Hong Kong	C	118	62	38	18	5	5	2		2	1	1			2		
	D	109	51	25	23	4	2	3		1		1	1		1		
Manchuria—																	
Harbin	C	3			1		10	10									
Kwantung—Dairen	C	6	5		2	1		7			11	5		8			
	D							4				1					
Nanking	C	P	P	P	P	P			P	P	P						
Shanghai—																	
Foreigners only	C	5	2	2	3		1	1		1	1	1	2	1			
Including natives	D	8	7	10	10		1	2	2	1		1	1				
Swatow	D	3	6	6	3	1		1	4	1		1	2				
Tienstsin	C	1	1	2	2	1											
Chosen (see table below).																	
Colombia:																	
Baranquilla	C		102	2	1												
Buenaventura	C		1		15	2		1	1	1	1		4	4			
Costa Rica:																	
Port Limon	C				6				2	2							
San Jose [2]	C			10	7												
Curacao (alastrim)	C			14	2	2					1						
Dahomey (see table below).																	
Dutch East Indies:																	
Borneo	C	1		185	90		10	4	2	2	10				2		
	D	1		12	31	1					1						
Java—																	
Batavia and West Java	C	14	14	78	64	1	1	5	5	1	4			3	1		
	D	7	7	6	11	1	1	3	2		1			2	1		
East Java and Madura	C				4												
Sanggi Islands	C	25	12	5	160	14	12										
	D			1	24	1	4										

Sumatra	C	2		48													
	D			5													
Egypt: Port Said	C	2			1		1										
Great Britain:																	
England and Wales	C	1,455	1,530	1,700	1,427	462	324	304	327	237	266	241	182	156			
Ashton under Lyne	C	4	29	15	18	6	3	4	4			3	4				
Bradford	C	5	2		3		1		1					1			
Cardiff	C			2	3									2			
Leeds	C	6	11	16	2									1			
London	C	597	699	710	602	222	138	148	129	130	136	125	107	84			
London and Great Towns	C	1,101	1,156	1,239	1,066	339	250	235	254	197	208	190	158	127			
	D	2	5	3	3												
Sheffield	C			8	2												
Stoke-on-Trent	C	12	41	122	85	19	9	13	21	3	10	15	4	3			
Scotland	C									1		3			1		
Hedjaz	C	11															
India	C	26,524	36,036	39,329	34,843	6,533	6,549	5,416	4,337								
	D	6,186	7,710	9,109	6,983	1,449	1,814	1,196	993								
Bombay	C	342	638	718	430	52	68	58	40	36	35	23	19	17	15		
	D	164	314	431	270	33	49	44	35	27	23	19	10	13	9		
Calcutta	C	185	399	361	495	109	70	52	71	56	45	45	25	27	19		
	D	130	287	305	403	94	72	40	32	50	37	29	30	17	17		
Cochin	C	234	184	291	183	13	8	7	9	4	1	10	1				
	D	27	29	35	15	5	1	2		2	1	1					
Karachi	C	30	38	33	30		6	7	1	5		1	1				
	D	9	16	47	17	2		1	1	2		1					
Madras	C	105	159	173	133	24	13	15	20	9	10	8	8	6	10		
	D	16	29	36	27	4	5	6		6	3	1		4	1		
Moulmein	C	65	143	146	43	27	29	20	13		9	6	6	4	10		
	D	18	40	41	7	4	6	5	6		3	3	1	3	4		
Negapatam	C		1					1			1		1				
Rangoon	C	7	7	10	4	2		3	1	1	5	1	2	2	1		
	D	4	2	5		1						1	1				
Tuticorin	C	3						5				1					
Vizagapatam	C	5	9	69	6	3	1	1			1						
	D		1	18	2		3										
India (French):																	
Chandernagor	C	3	11	6	10	6	2	8	8	4	8	5	2		1		
	D		5	2	2	2	4	1				2	1		1		
Karikal	C	3	12	24	19	6	5	1		4	3	1	3	1			
	D	3	8	7	8	2	1			2	2	1	3	1			
Pondicherry Province	C	22	52	21	24	9	13	10	8	1	4	9	6		9		
	D	19	40	13	20	7	12	10	7	4	4	9	6		9		
India (Portuguese)	C	16	50	38	44	2	27	5	13		3						
	D		5	2	8		3	1	1		2						
Indo-China (see also table below):																	
Pnompenh	C					1		1	1								
	D	1			2					1							
Saigon and Cholon	C	3	4	3	5	1	1		1	1							
	D	3	2	1	5		1		1								

[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26
Iraq:																	
Baghdad	C	7	3		8	1				1				1			
	D	3	1		1	1											
Basra	C		1		1												
Mossul Liwa	C	26	12		22	13		8			1		3	47	20		
	D	7	2		3	2		1			1			19	1		
Ivory Coast (see table below).																	
Jamaica (alastrim)	C								2								
Japan: Tokyo	C				1												
	D				1												
Macao	D		2	3	2	1											
Mexico (see also table below):																	
Jalisco (State): Guadalajara	D	9	14	22	20			6	1	4		5	6	3	1		
Juarez	C	2	3	2								6					
	D	1	1									1					
Mexico City and surrounding territory [3]	C	30	38	106	99	30	15	17	18	17	23	20	17				
	D	7	21	31	47	6	12	8	6	5	4	3	5				
Morelos State.[4]																	
Progreso	C							1									
	D							1				1					
San Luis Potosi	C		1														
	D		1														
Morocco (see table below).																	
Nigeria (see also table below): Lagos	C	5	2	1	1								1				
	D	2															
Persia (see table below).																	
Philippine Islands: Sarangani and Balut Islands [5]	D	18	3														
Poland	C		2		7		1		2								
Portugal: Lisbon	C	4	7	7	8	6		2		1		2	7		7		
Rumania	C	1	1	2													
Siam	C		2		8	2											
	D	1			4												
Somaliland, British: Boales	C	35	19	2													
	D	8	2	6													
Spain	C										4		8		1		
Straits Settlements	C	2		5	5	1	3	2	5	5		1	3	1	2		

Sudan (Anglo-Egyptian)	C	230	79	60	42		5	13	1	4	8	1	54	8	1		3
	D	34	6	5	4			1	1				3		1		
Sudan (French) (see table below).																	
Syria (see table below).																	
Taiwan: Taihoku (see table below).																	
Tunisia: Tunis	C	7	3	3	4		1		1			2					
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P	P	P	P	P								
Orange Free State	C	P	P	P													
Transvaal	C	P	P	P													
Upper Volta	C		26	2	3				1				5				
Zanzibar	C			13													
On vessel:																	
S. S. Tairoa, at Liverpool, from London	C		1														
S. S. Karagola, at Zanzibar, from India	C	4															
S. S. Karagola, at Lourenco Marques, from India	C		1														
S. S. Elysia, at Port Sudan, from Bombay	C				1												
S. S. Naldera, at Port Said	C					1											
S. S. Manoa, from Honolulu to San Francisco	C												1				

Place		December, 1929	January, 1930	February, 1930	March, 1930			April, 1930			May, 1930			June, 1930	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Belgian Congo	C	74													
	D	4													
Dahomey	C	19													
Indo-China (see also table above)	C	142	400	434			26	261				173	132	80	133
Ivory Coast	C					7									
Sudan (French)	C	17	229	213		200	409	371		150	40	56	178	76	
	D		25	11		18	31	30		6	7	7	18	18	
Syria: Beirut	C	25	70	18	4	8	5	10	2	7			7	6	1
Taiwan: Taihoku	C			43	31	12	15	10	2						

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
British East Africa (see also table above):							
Kenya	C	168	12	12	175	174	
Uganda	C		184	109			78
	D		155	99			69
Chosen	C		1	4		5	
	D			1		1	
France	C	9	9	23	8		3

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
Mexico: Durango (see also table above)	D	4	12	6	5	4	4
Morocco	C	84	29	74		10	18
Nigeria	C	293					
	D	70					
Persia	C	P					
Turkey	C	883	215	114		3	16
	D	457	66	42			

[3] During the month of March, 1930, 100 cases of smallpox were reported in Mexico City, Mexico, and surrounding territory.
[4] Newspaper reports of Feb. 4 show an epidemic of smallpox in Ionacatepec, Morelos State, Mexico, and vicinity, giving 600 deaths in preceding 2 weeks.
[5] On Feb. 1, 1930, 317 cases of smallpox with 102 deaths were reported to that date in the Sarangani and Balut Islands.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930: 12	April 19	April 26	May, 1930: 3	May 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19
Algeria:																			
Algiers	C	3	4	6	2	3	2	1	1	2	4	8	2		1				
Constantine Department	C	4	5	11	4	9	2			4		2	11		1				
Oran	C	2										3				4			
Arabia: Aden	C			1															
	D			1															
Bolivia: La Paz.[1]																			
Brazil: Porto Alegre	C		2						1										
Bulgaria	C		13	9	15				1		5		1		9	6		4	
	D		1		1				1		1		1						
Sofia	C	1																	
Chile:																			
Talcahuano	D	1																	
Valparaiso	C	1																	
China:																			
Manchuria—Harbin	C		1	4	5		20	27											
Shanghai	C			1															
Tientsin	C	1																	
Chosen (see table below).																			
Czechoslovakia(see table below).																			
Egypt:																			
Alexandria	C						1								1		1		
Beheira Province	C	14	18	2			2		9	21	9	10	17	16	7	5		5	
	D		5						4	4	4	1	1	1		2		1	
Cairo	C		1																
Port Said	C	2	1																
Suez	C	1																	
Great Britain: Scotland—																			
Dunfermline	C																	1	
Glasgow	C									1									
	D									1									
Greece (see table below).																			
Iraq: Baghdad Liwa	C			2															
Ireland:																			
Irish Free State—																			
Ballina—Mayo County	C											2		1				1	
Dingle—Kerry County	C						3	2											
Mohill—Leitrim County	C															9			
Shillelagh—Wicklow County	C													1		3	1		
Swinford—Mayo County	C									7	7								

Northern Ireland—Cookstown	C		3																
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico: Mexico City, including municipalities in Federal District	C	12	9	4	2	1		1		2		4	2	3	1	3			
	D	4		1	2	1		1				3		1					
Morocco	C	23	21	38	6	5	3	1	3	6	1	1	1		6	8		4	
	D			7	2	1													
Palestine	C		1	6		1				2			2				3	1	1
Poland	C	296	183	228	59	64	53	67	64	45	34	28			26	37		24	
	D	21	8	13	4	2	3	6	2	2		1			2	3		4	
Portugal:																			
Lisbon	C							4											
Oporto	C		1	2	1														
Rumania	C	241	203	185	71	46		69	60	58									
	D	25	23	12	1	9		1	10	11									
Spain: Valencia	C													2		1		3	
	D																	1	
Tunisia	C		3						2	2	1	1			2	16			
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P			P	P	P	P					P	P	
Natal	C	1	3	P	P	P	P		P	P		P					P	P	
Orange Free State	C	P	P	P					P	P	P	P					P	P	
Transvaal	C				P	P	P												
Yugoslavia (see table below).																			

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
Chosen: Seoul	C		17		3		
Czechoslovakia	C	10	2	42	29	12	
France	C						
Greece: Athens	C	12	6	3	1	3	
Latvia	C	18					

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
Lithuania	C	2	70	62	73	27	16
	D		5	4	4		
Turkey	C	2	3	1	3	16	2
Yugoslavia	C	26	33	46	22	16	6
	D	3	5	2	4	1	

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast, July 10, 1930	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

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SPECIAL ARTICLES

Immunizing Values of Toxoid and Toxin-antitoxin

Various Antirabic Vaccines and Vaccine Paralysis

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

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PUBLIC HEALTH REPORTS

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THE IMMUNIZING VALUE OF DIPHTHERIA TOXIN-ANTITOXIN MIXTURE AND OF DIPHTHERIA TOXOID[1]

By W. T. HARRISON, *Surgeon, United States Public Health Service, National Institute of Health (formerly Hygienic Laboratory), Washington, D. C.*

The value of diphtheria toxin-antitoxin mixture in rendering susceptible individuals insusceptible to diphtheria has become so well grounded in public-health practice as to require no comment.

Following the introduction by Ramon of diphtheria toxoid (anatoxine), this product has come more widely into use, and it would seem advisable to compare its activity in human beings with the older product whenever the opportunity offers. It is generally accepted that toxoid is more effective in immunizing laboratory animals, and the claim has been made that the immunity in children following its use appears earlier than that following the use of toxin-antitoxin mixture.

In the course of work at the Hygienic Laboratory, now the National Institute of Health, in an attempt to develop an official antigenic test for toxin-antitoxin mixture, an opportunity was presented to observe the results following the use of the two products in comparable groups of school children. In the two groups of white children used for comparison, all were Schick-tested before immunization and again after the stated interval following the last immunizing injection. The toxin used for these tests had been kept at 5° C. for three years following preparation, and the M. L. D. was accurately determined before beginning the work. Dilutions were always made on the morning of the tests, and all diluted toxin was used before noon of the same day. The Schick dose was 1/50 M. L. D. in a volume of 0.1 c. c. The test in children who received toxin-antitoxin mixture was controlled with heated toxin, and in those who received toxoid by toxoid diluted 1 in 20 with physiological salt solution. Readings were made on the third or fourth day, and all children who gave a positive reaction to the toxoid control were immunized with toxin-antitoxin mixture.

[1] Presented at the Forty-Fifth Annual Conference of State and Provincial Health Authorities of North America, Washington, D. C., June 20, 1930 (held jointly with the Twenty-eighth Annual Conference of State and Territorial Health Officers with the United States Public Health Service).

The toxin-antitoxin mixtures used contained 0.1 L+ dose of toxin per cubic centimeter and were from (1) routine samples submitted by the manufacturers for test prior to release for distribution, (2) special lots furnished by the manufacturers for use in this work, and (3) one special lot prepared at the National Institute of Health. All lots were carefully tested for toxicity in guinea pigs and fell within the range which is considered proper for this product. All were kept in the cold room at 5° to 10° C. until used. It is believed that the mixtures used in these children may be considered at least equal to the product available in the open market, since storage conditions following preparation were ideal.

The toxoid was furnished by five manufacturers, upon request, in the same manner as were furnished the special lots of toxin-antitoxin mixture. All lots of both products may be taken as routine samples from the various producers, no effort having been made to select highly antigenic lots of either.

The ages of the children ranged from 1 to 16 years, a few preschool children being brought to the school buildings by the parents to receive the injections. These children are included among the 5-year olds.

Table 1 shows the results, by manufacturer and lot number, from three doses of toxin-antitoxin mixture, 1 c. c. each at 7-day intervals in 362 Schick-positive white children. The column headed "Interval (days)" gives the time elapsing between the last dose of toxin-antitoxin mixture and the post-Schick tests. The great variation in antigenic efficiency of different lots is readily seen; 64 per cent of the entire number were rendered Schick negative.

Table 3 shows the results from immunization with diphtheria toxoid in 476 Schick-positive white children. The product from manufacturer "V" was given in three doses of 0.5, 0.5, and 1.0 c. c. each, at intervals of seven days, the interval for toxin-antitoxin doses. The toxoids from "W," "X," and "Y" were given in two doses of 1 c. c. each at a 31-day interval. The toxoid of manufacturer "Z" was given in two doses of 1 c. c. each, with a 42-day interval, the additional 11 days being due to a fire occurring in the school. For this reason the interval between the last immunizing dose and the post-Schick test was reduced to 90 days. It is seen from this table that the poorest results from toxoid were better than the best from toxin-antitoxin mixture; 95 per cent of the entire number were rendered Schick-negative. The L. F. value per c. c.—that is, the number of units of antitoxin required to flocculate 1 c. c. of toxoid—is shown in the last column of Table 3.

The negro children who received three doses of toxin-antitoxin mixture have not been used in comparing the results obtained from the two products; but since the figures are available, they are given for their general interest and to compare them with white children

receiving the same product. In the negro children the preliminary Schick test was done with a check-tested, commercial product. The human dose was 1/50 M. L. D. in a volume of 0.1 c. c. The post-Schick test was done with the same National Institute of Health toxin, which was used in the white children. The results by manufacturer and lot number are shown in Table 2. In 387 Schick-positive negro children 68 per cent were rendered Schick-negative. Results of preliminary and post-Schick tests by ages are shown in the last four columns of Table 4.

Table 4 was prepared to show the per cent of susceptibles in the different age groups and the per cent of susceptibles of different ages rendered immune by toxin-antitoxin mixture or toxoid. The small numbers of children above 14 years are omitted as not affecting the final figures. The preliminary Schick test in the white children who received toxin-antitoxin mixture gave 75 per cent positive reactions while those who received toxoid showed 61 per cent positive to the preliminary test. The toxoid group contained a larger proportion of older children than the toxin-antitoxin mixture groups; and, when this difference in ages is adjusted by rearranging the figures for the toxoid group to give the same age distribution as in the toxin-antitoxin mixture group, 6 of the 15 per cent difference disappears, leaving 76 per cent susceptible in the group which received toxin-antitoxin mixture and 67 per cent corrected for the groups which received toxoid. Correcting for the difference in ages in the two groups for the post-Schick test, the percentage of negative reactors in those who received toxoid is slightly increased (95.8 per cent).

The differences in the economic status of the two groups of children were so slight as to be without influence upon susceptibility. A considerable number stated that they had already been immunized either in other schools or by the family physician; but no attempt was made to take these reports into account, since with no effort toward selection this factor should tend to equalize itself in the two groups.

The superiority of toxoid over toxin-antitoxin mixture in these two groups of children as measured by the Schick test is very apparent, 95 per cent rendered Schick negative by the former as compared with 64 per cent by the latter.

Twenty-seven children (4 per cent) tested with diluted toxoid as a control to the Schick test reacted positively to the control; three of these were younger than 8 years. In order to avoid the possibility of reaction due to sensitivity to the products of the diphtheria bacillus, these 27 children were immunized with toxin-antitoxin mixture. Among the 476 children receiving toxoid, no local or general reactions were reported. Careful inquiry was made of the school authorities but no disturbance following a dose of toxoid was sufficiently definite to be recalled at the next visit.

For immunizing young children, including 6-year olds, without preliminary Schick-testing, and older children who react negatively to a diluted toxoid control of the Schick test, diphtheria toxoid seems to be practically an ideal agent both on account of the complete absence of local or general reactions and the very high percentage of successful immunizations following two injections.

The usual toxin reactions were observed in children receiving toxin-antitoxin mixture, consisting of swelling and redness, but not severe enough in any case to require special attention.

Acknowledgments.—The writer's appreciation is due Surgs. M. V. Veldee and L. M. Rogers for assistance in performing certain post-Schick tests, and to Laboratory Assistant B. T. Sockrider for technical assistance during the entire study. Dr. W. C. Fowler, health officer for the District of Columbia, kindly permitted the work to be done in the District schools and detailed to the work Miss Katherine Douglass, public health nurse, whose assistance was most valuable.

CONCLUSIONS

1. In 475 school children diphtheria toxoid gave an immunity response, as measured by the Schick test, of 95 per cent as compared with 64 per cent in 355 children receiving 0.1 L+dose toxin-antitoxin mixture.

2. No local or general reactions were reported in children receiving toxoid; those giving reactions to intracutaneous test injections of diluted toxoid having been removed from the group.

3. Two doses of 1.0 c. c. each, with an interval of one month, produced a negative Schick reaction in a high percentage of subjects.

(Tables 1–4 follow)

TABLE 1.—*The preliminary Schick reaction in a group of white children of both sexes and ranging in age from 1 to 16 years; and the changes produced in the positive reactors by the injection, at weekly intervals, for three doses, of 1.0 c. c. 0.1 L+diphtheria toxin-antitoxin mixture*

Manufacturer	Lot No.	Preliminary Schick test		Interval (days)	Post-Schick test	
		Number of children	Per cent positive		Number of children	Per cent negative
C	2	39	74	122	16	69
	3	46	74	122	19	68
	4	60	80	123	20	65
	7	142	79	179	79	61
D	4	160	79	203	82	73
E	3	115	66	178	43	35
G	1	51	80	122	29	66
I	1	47	77	123	15	67
L	1	110	77	133	59	73
Total		770	76		362	64

TABLE 2.—*The preliminary Schick reaction in a group of negro children of both sexes and ranging in age from 1 to 16 years; and the changes produced in the positive reactors by the injection, at weekly intervals, for three doses, of 1.0 c. c. 0.1 L+diphtheria toxin-antitoxin mixture*

Manufacturer	Lot No.	Preliminary Schick test		Interval (days)	Post-Schick test	
		Number of children	Per cent positive		Number of children	Per cent negative
A	1	23	78	123	8	25
B	1	56	84	123	20	70
	2	36	75	122	16	63
	3	74	78	123	12	83
	4	52	85	123	16	88
C	1	73	73	123	22	41
	5	68	65	123	15	67
	6	47	79	107	11	82
D	1	51	76	123	18	44
	2	171	62	103	53	68
	3	158	75	103	60	73
E	1	33	76	122	13	62
	2	32	66	123	8	63
	3	129	62	195	57	75
F	1	35	63	122	9	56
H	1	67	75	123	10	60
I	2	29	90	123	11	82
J	1	15	73	123	7	71
K	1	59	66	107	12	83
L	1	30	57	133	9	89
Total		1,238	71		387	68

TABLE 3.—*The preliminary Schick reaction in a group of white children of both sexes and ranging in age from 1 to 16 years; and the changes produced in the positive reactors by the injection of diphtheria toxoid*

Manufacturer	Lot No.	Preliminary Schick test		Interval (days)	Post Schick test		L. F. per c. c.
		Number of children	Per cent positive		Number of children	Per cent negative	
V [1]	1	225	61	133	86	92	11
W [2]	1	143	70	119	72	92	0
X [2]	1	323	58	119	128	95	8
Y [2]	1	267	61	119	118	96	4
Z [3]	1	170	55	90	72	99	4
Total		1,128	61		476	95	

[1] Immunizing doses 0.5, 0.5, and 1.0 c. c., 7-day intervals.
[2] Immunizing doses 1.0 and 1.0 c. c., 31-day interval.
[3] Immunizing doses 1.0 and 1.0 c. c., 42-day interval.

TABLE 4.—*The age distribution of the white and negro children receiving the preliminary and the post-Schick test, the per cent positive on preliminary test and the per cent rendered negative by immunization with toxin-antitoxin mixture or toxoid*

Age groups	White children								Negro children			
	Preliminary Schick test				Post-Schick test				Preliminary Schick test		Post-Schick test	
	Toxin-antitoxin mixture		Toxoid		Toxin-antitoxin mixture		Toxoid		Toxin-antitoxin mixture		Toxin-antitoxin mixture	
	Number tested	Per cent positive	Number tested	Per cent positive	Number tested	Per cent negative	Number tested	Per cent negative	Number tested	Per cent positive	Number tested	Per cent negative
5 and under	87	90	52	92	35	63	21	100	106	85	27	81
6	135	85	138	81	67	73	75	88	219	87	77	75
7	112	84	157	73	63	62	73	95	237	77	72	64
8	91	74	133	65	42	59	65	97	221	73	89	62
9	91	74	137	59	48	58	61	95	138	62	38	63
10	69	72	150	49	35	60	56	96	105	59	32	72
11	51	67	125	53	23	69	46	100	84	57	20	75
12	44	61	111	54	18	61	47	94	58	48	12	91
13	44	68	57	39	19	63	18	100	42	59	14	57
14	22	41	49	35	5	60	13	100	18	44	5	40
Total	746	76	1,109	61	355	64	475	95	1,228	72	386	68

ANTIRABIC VACCINE PARALYSIS

CONSIDERATION OF VARIOUS VACCINES[1]

By G. W. McCoy, *Director, National Institute of Health (formerly Hygienic Laboratory), United States Public Health Service*

More or less serious paralytic manifestations following antirabic vaccinations have been recognized since the earliest experience with the method, even during the days of Pasteur.

While the occurrence of paralysis during the course of, or following, antirabic treatments is not common, it occurs often enough to constitute a factor that must be weighed when we are considering the question of advising treatment. In connection with most biologic agents used as prophylactics, the question of the hazard due to, or associated with, the prophylactic agent itself must be kept in mind; for example, only last winter, through the courtesy of Surg. J. P. Leake, of the Public Health Service, I saw a practically complete paraplegia due to the use of tetanus antitoxin as a prophylactic. We must recognize and remember that acute anaphylactic shock is not the only unpleasant sequel of some of our prophylactic agents of a biologic nature.

The essential cause of the paralysis that develops in connection with antirabic treatment is not known. Usually it is regarded either

[1] Presented at the Twenty-eight Annual Conference of the State and Territorial Health Officers with the United States Public Health Service, Washington, D. C., June 18, 1930 (held jointly with the Forty-fifth Annual Conference of State and Provincial Health Authorities of North America).

as a modified form of rabies (street virus), as a manifestation of the action of fixed rabies virus; or as a toxic, or an anaphylactic, action due to the introduction of a foreign protein, in this case the central nervous system of the rabbit. In discussing this subject in 1913, Surgeon Hasseltine (Public Health Reports, October 24, 1913) gave the following as the chief theories of causation:

(*a*) That it is due to anaphylaxis resulting from the injection of foreign animal tissue (rabbits' cord);

(*b*) That it is due to a "toxin" elaborated by the specific organism of rabies;

(*c*) That it is due to rabies resulting from street virus received at the time the bite was inflicted;

(*d*) That it is due to rabies resulting from fixed-virus infection;

(*e*) That it is due to infection with extraneous organisms introduced with the virus during treatment; and

(*f*) That it is due to hysteria and other neuro-psychologic disorders.

Perhaps at the present time one would like to add the suggestion that the antirabic vaccines may activate a virus lying dormant in the body, or may serve to enhance susceptibility to an ordinarily nonpathogenic virus. Another thought that will occur to one familiar with the frequency of pathological processes in the central nervous system of rabbits is the possibility of the occasional susceptibility of man for a virus normally, or perhaps we had better say, commonly, found in rabbits.

As predisposing causes there are mentioned alcoholism, overexertion, and exposure; but one doubts the essential importance of any of these.

There are some interesting features in connection with the clinical aspects to which I wish to refer briefly. The complications nearly always affect adults. The time of onset varies, from as early as the sixth day from the inauguration of the treatment to as late as the twentieth, exceptionally even longer. The onset may be with general symptoms—vomiting, lumbar pains, chilliness, and fever—certainly suggestive of an infectious process. The paralysis of a muscle or group of muscles is often preceded by sensory symptoms such as pain, numbness, or tingling. The extent of paralysis varies from a single muscle or group, as the facial muscles, to a complete paraplegia with ascending paralysis that ends in death in a few days through failure of respiration. Termination may be by death, which is unusual though not rare, by complete recovery in the course of a few weeks or a few months, or by partial recovery. Death may be due to respiratory paralysis, to bed sores, or to cystitis.

Fielder (Jour. A. M. A., June 31, 1916, vol. 66) puts the reported death rate as 16.2 per cent, but points out that probably this is too high, as severe and fatal cases are those most likely to be reported.

When we inquire as to its frequency, we find a most bewildering variation in figures from different institutes and from different countries. Thus in figures recently collected from Italy by the health committee of the League of Nations we find a report of 34 cases among 18,502 persons treated—1 in each 574; while from Russia there were 32 cases among 176,455—1 in each 5,514. In other words, the condition is about 10 times as frequent in the Italian experience as in the Russian, and this difference is by no means an isolated example.

A few years ago we collected data from a number of producing establishments in the United States and learned of but 3 cases of paralysis among about 20,000 treatments.

In our experience in the Hygienic Laboratory there were, during the nearly 13 years in which we produced antirabic vaccine, 4 known cases among over 1,800 persons treated.

When this subject was assigned to me for presentation at this time, I collected the data from a number of licensed producers and from several that do not have a Federal license, paying particular attention to the methods of treatment employed in relation to the frequency of paralysis. These figures cover the 15-month period from January 1, 1929, to April 1, 1930; they are presented in the following table:

Type of treatment	Cases treated	Cases of paralysis reported	Ratio	Remarks
Killed virus (Semple method and modifications)	17, 645	6	1 : 2, 941	4 fatal; 2 partial recovery.
Frozen and desiccated virus (Harris method and modifications).	4, 148	2	1 : 2, 074	2 recovered.
Living diluted virus (Hoyges method and modifications).	2, 593	0	0	
Attenuated virus (Pasteur method)	1, 077	0	0	

Clearly these figures fail to give us any clue as to the relative hazard of the several forms of treatment dealt with. Indeed, if any one method of treatment had been proved by experience to have a definitely higher paralysis rate than others, that method would naturally disappear from use, unless it had some very marked advantage from some other point of view. I suspect that the number of cases in the present series is below the number that actually occurred; otherwise it is difficult to reconcile our high incidence of 1 case in about each 450 treated in the Hygienic Laboratory with the failure to secure a report of a single case in the over 1,000 treatments reported in this series. I am further influenced in the suspicion that the number is too low by the high death rate (50 per cent) among those reported here.

What to do when paralysis appears if it develops before the treatment is completed, is a question; one has good authority for either

continuing with the treatment or stopping the inoculations. Generally speaking, the decision should rest on the urgency of treatment from the point of view of the hazard of rabies. So far as I know, there is no particular medicinal treatment for cases of paralysis that have developed.

With the data at hand I regret that we have no grounds for recommending, or discouraging the use of any form of treatment, nor have we any other suggestions as to how these unfortunate cases may be obviated.

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES [1]

June 15–July 12, 1930

Poliomyelitis.—The infantile paralysis situation in California, to which attention was called in the previous summary,[2] has grown more serious, and the incidence has risen rather sharply in other sections. Poliomyelitis is a warm-weather disease, and a seasonal rise is normally expected beginning in the late spring or early summer; but the current increase in the United States is considerably greater than the expectancy. From June 1 to the date of the latest reports available at this writing (week ended July 19), there were reported an aggregate of 896 cases in the 43 States regularly tabulated. During the corresponding period of 1929 there were but 232 cases reported; in fact, it would be necessary to go back more than seven years to find an equivalent rise at this season.

Slightly more than half of the cases (480) were reported from California; but even if these are deducted from the national total, the reports for the remainder of the country represent an increase of 79 per cent over the figures for the corresponding seven weeks of last year.

An examination of the regional distribution (Table 1) shows that the attack rates are, in all sections except the Atlantic coast, from 3 to 13 times as high as for the corresponding period of last year. The table also shows that the more western groups of States have higher rates than the central and eastern groups.

[1] From the Office of Statistical Investigations, U. S. Public Health Service. This summary is made up from weekly telegraphic reports received by the Public Health Service from State health departments. These reports are published weekly in tabular form in the section of the Public Health Reports entitled "Prevalence of Disease."

The numbers of States included under the various diseases are as follows: Typhoid fever, 41; poliomyelitis, 43; meningococcus meningitis, 42; smallpox, 42; measles, 38; diphtheria, 42; scarlet fever, 41; influenza, 31.

[2] Public Health Reports, June 20, 1930, p. 1421.

Table 1.—*Poliomyelitis case rates, by geographical divisions, June 1 to July 19, 1930, inclusive, and comparative rates for 1929*

Division	1930		1929	
	Cases reported	Rate per 1,000,000 population	Cases reported	Rate per 1,000,000 population
Pacific and Mountain	508	46.5	38	3.5
South Central	185	9.9	44	2.3
West North Central	56	4.2	19	1.4
East North Central	46	2.5	16	.9
New England and Middle Atlantic	65	2.9	68	3.0
South Atlantic	36	3.1	47	4.0
All regions	896	9.4	232	2.4

Table 2.—*Poliomyelitis attack rates in States with high rates, June 1 to July 19, 1930, inclusive, and comparative rates for 1929*

State	1930		1929	
	Cases reported	Cases per 1,000,000 population	Cases reported	Cases per 1,000,000 population
California	480	102.6	29	6.2
Louisiana	110	56.2	0	.0
New Mexico	5	12.5	2	5.0
Oklahoma	30	12.2	1	.4
North Carolina	33	11.1	35	11.7
Arizona	5	10.2	1	2.0
Minnesota	28	10.2	6	2.2
Kansas	15	8.1	4	2.2
Indiana	21	6.6	1	.3

Within individual regions, the distribution is markedly uneven. Thus, California furnishes about 95 per cent of the cases in the Pacific and Mountain groups of States; Louisiana furnishes almost as many as all the other Southern States combined; Massachusetts dominates the New England rate, although its attack rate (3.6 per million) is still low in comparison with the Western rates. Table 2 shows individual States reporting the highest rates. In this connection, it should be borne in mind that for a disease as difficult to diagnose in its atypical forms as is poliomyelitis, the case rates are probably very much understated, particularly in those regions where the incidence has not yet become a subject of discussion.

Meningococcus meningitis.—The meningitis incidence showed a decline which was greater than would be expected on seasonal grounds alone. During the 4-week period, 342 cases were reported, as compared with 470 during the preceding period, and with 570 during the corresponding period of last year. During the week ended July 5, there were noticeable flare-ups in three States—New York State, California, and Michigan. Whether this coincidence is due to anything more than chance, it would be difficult to state at this time.

Smallpox.—The incidence of smallpox, though declining seasonally, maintained its excess over the average experience of recent years. Reported cases numbered 2,608, as compared with 1,890 for the corresponding period in 1929, and with 1,748 for the same period in 1928. The highest rates occur in the North Central States (i. e., the Great Lakes region and west thereof), on the Pacific Coast, and in Oklahoma in the South.

Diphtheria.—There was another gratifying decline in diphtheria to a record low level, taking season into consideration. During the 4-week period of this report, 2,911 cases were reported, as compared with 4,522 during the same period last year. During the past five months, every week has established a low diphtheria record in relation to the corresponding period of previous years.

Influenza.—The decline in influenza from the previous 4-week period was somewhat greater than the seasonal expectancy, and the incidence is at a low level in relation to that of recent years. Reported cases numbered 390, compared with 480 for the same period of last year.

Measles.—The incidence of measles was above the average for this season. The reports showed 27,848 cases, as against 20,284 for the same period last year.

Scarlet fever.—The incidence of scarlet fever continues to be the lowest for the season during recent years. There were 5,443 cases reported, as compared with 6,264 for the same period last year.

Typhoid fever.—The recent favorable record for typhoid fever was maintained. The number of reported cases, 1,726, was only slightly above the low record established last year, when 1,682 cases were reported during the corresponding 4-week period.

In recent years there has been a second interesting change in the typhoid fever curve, in that the peak incidence has been occurring earlier in the year than formerly. In 1926, the peak came about the middle of September; in 1927 and 1928, about the third week of August; and in 1929 about the first week of August. This change has apparently resulted because the declines in the case rates have been more pronounced during the late summer than during the earlier months. It will be interesting to note whether this tendency will continue into the present year.

Mortality, all causes.—The mortality rate for large cities, as reported by the Bureau of the Census, was about normal, as compared with previous years. The average weekly rate (annual basis) was 11 per 1,000 inhabitants.

COURT DECISION RELATING TO PUBLIC HEALTH

Milk ordinance held void because in conflict with State statutes.—(Connecticut Supreme Court of Errors; Shelton *v.* City of Shelton et al., 150 A. 811; decided June 2, 1930.) An ordinance of the city of Shelton made it unlawful to sell at retail any milk or cream unless produced from tuberculin-tested cattle or pasteurized. The city charter authorized the city to adopt ordinances "to license milk dealers and to regulate the sale and manner of distribution of milk and to prohibit the sale thereof unless in accordance with such regulations." In the same charter section, in dealing with foodstuffs, the power was given to adopt ordinances "and to prohibit the sale thereof [foodstuffs] when in such condition as to endanger the public health." A State law provided that certain specified statutory provisions should not "affect the authority of any * * * city * * * to enact ordinances or by-laws for the control, regulation, sale or distribution, within its limits, of milk which may be detrimental to public health."

The plaintiff was a registered producer of milk under the State laws and a licensed milk dealer under the ordinances of the defendant city. The milk produced and sold by him had been tested and analyzed periodically and found to be particularly clean and pure and not detrimental to public health in any way. In an action brought by the plaintiff, the question was presented to the supreme court as to whether the city of Shelton had the power to adopt the ordinance providing that milk or cream sold at retail should be produced from tuberculin-tested cattle or be pasteurized. The court examined in detail the State statutes dealing with milk and cream and stated that "The statute law recognizes at least five kinds of milk and makes all five lawful provided the statutory provisions are complied with in their production and sale, viz: Raw milk, tuberculin-tested milk, pasteurized milk, grade A milk, and certified milk." The court said that "The city of Shelton was without power to enact an ordinance prohibiting the sale at retail of any one of these kinds of milk which are authorized by statute," and held that the ordinance conflicted with the statutes of the State and was, for that reason, void.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended August 2, 1930, and August 3, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 2, 1930, and August 3, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929
New England States:								
Maine	5	2			14	20	0	0
New Hampshire	4				7	13	0	0
Vermont	1				6	5	0	0
Massachusetts	27	54	2		94	49	0	4
Rhode Island	2	2			2	10	0	0
Connecticut	4	12	1	1	10	36	2	0
Middle Atlantic States:								
New York	66	126	[1] 2	[1] 4	291	162	11	17
New Jersey	26	62	2	5	113	29	7	7
Pennsylvania	55	104			254	179	5	5
East North Central States:								
Ohio	38	18	3	2	55	7	5	4
Indiana	7	15	1		8	67	5	0
Illinois	66	91	17	14	18	126	11	12
Michigan	15	88		1	60	66	8	45
Wisconsin	10	18	2	16	88	184	4	2
West North Central States:								
Minnesota	11	11	1		38	13	2	7
Iowa		2				13	0	0
Missouri	13	14			16	12	5	3
North Dakota		8			1	41	0	1
South Dakota	1	1			9	5	1	3
Nebraska	7	2			6	49	0	0
Kansas	6	7	4		22	54	1	3
South Atlantic States:								
Delaware					3	3	0	0
Maryland [2]	9	15	2	1	11	3	1	0
District of Columbia	4	6	1		20	2	0	0
Virginia							1	
West Virginia	5	3	8		28	23	0	1
North Carolina	34	45			15		2	3
South Carolina	24	20	47	119		1	2	0
Georgia		12	7	2	19	17	1	0
Florida	6	11			4	4	2	0

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 2, 1930, and August 3, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929
East South Central States:								
Kentucky					4		1	3
Tennessee	3	5	1		5		3	1
Alabama	5	13	1	7	13	5	2	1
Mississippi	6	19					0	
West South Central States:								
Arkansas	1	1	2		1		0	0
Louisiana	6	12	2	5	3	6	3	2
Oklahoma [1]	6	12				16	2	2
Texas	33	28		13	6	10	1	4
Mountain States:								
Montana	1	9				45	2	0
Idaho	1	1			2	1	0	0
Wyoming		3			1	1	0	2
Colorado	5	6			18	8	0	0
New Mexico	6	2	1	1	8	4	0	3
Arizona					13		0	2
Utah [2]		1			3	1	0	1
Pacific States:								
Washington	3	6			40	30	3	2
Oregon	3	8	2	1	26	22	1	1
California	35	36	10	12	158	34	5	6

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929
New England States:								
Maine	0	0	4	6	0	0	6	2
New Hampshire	0	0	1	1	0	0	0	0
Vermont	0	1	1	4	0	3	0	0
Massachusetts	13	1	41	64	0	0	6	9
Rhode Island	2	0	4	1	0	0	0	1
Connecticut	1	0	7	11	0	0	2	10
Middle Atlantic States:								
New York	13	11	70	54	0	0	18	25
New Jersey	2	1	17	30	0	0	3	17
Pennsylvania	1	5	78	76	1	1	40	38
East North Central States:								
Ohio	12	1	97	46	21	15	46	18
Indiana	2	0	20	105	40	53	15	10
Illinois	4	1	52	78	19	14	46	41
Michigan	2	9	47	67	25	37	7	7
Wisconsin	1	0	21	26	2	15	2	2
West North Central States:								
Minnesota	10	0	18	17	4	2	2	5
Iowa	4	0	8	16	22	14	4	5
Missouri	3	1	16	12	15	7	25	12
North Dakota	0	1	6	18	11	4	0	1
South Dakota	2	0	2	5	1	19	3	2
Nebraska	0	0	1	3	10	11	7	1
Kansas	6	1	17	17	12	12	17	18
South Atlantic States:								
Delaware	1	0	1	2	0	0	6	1
Maryland [2]	2	1	7	13	0	0	34	23
District of Columbia	0	0	2	4	0	0	6	5
Virginia	2	14						
West Virginia	0	1	13	17	4	4	35	31
North Carolina	3	3	35	34	0	0	70	58
South Carolina	2	1	2	8	3	0	83	87
Georgia	0	0	14	5	0	0	71	43
Florida	0	0	1	4	0	0	3	2

[1] Week ended Friday.
[2] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain cummunicable diseases reported by telegraph by State health officers for weeks ended August 2, 1930, and August 3, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929	Week ended Aug. 2, 1930	Week ended Aug. 3, 1929
East South Central States:								
Kentucky	0	1	22	17	0	5	34	18
Tennessee	2	6	6	11	2	6	47	74
Alabama	2	0	4	21	0	0	42	33
Mississippi	3	0	4	8	1	0	38	53
West South Central States:								
Arkansas	8	0	2	2	2	0	35	18
Louisiana	28	0	10	7	0	0	38	37
Oklahoma [3]	12	0	12	8	5	8	43	60
Texas	6	0	22	16	14	8	26	48
Mountain States:								
Montana	0	0	7	8	3	2	3	3
Idaho	1	1	0	0	1	5	4	5
Wyoming	0	0	3	3	0	8	0	0
Colorado	0	1	6	2	1	9	8	7
New Mexico	0	1	2	2	1	0	4	7
Arizona	0	0	1	0	0	0	7	3
Utah [4]	0	0	2	3	0	3	1	1
Pacific States:								
Washington	1	0	13	4	16	30	5	6
Oregon	2	1	2	0	6	8	8	5
California	71	1	26	65	18	10	30	23

[4] Week ended Friday.

[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June, 1930										
California	20	212	79	2	5,919	13	208	393	178	77
District of Columbia	2	25	4		260		0	34	0	4
Maryland	0	57	24	3	138		0	188	0	28
Nevada					14		0		16	
North Carolina	7	42	45		268	748	18	63	44	133
Virginia	6	58	323	77	1,259	169	7	72	6	137
July, 1930										
Iowa	2	12			78		9	36	182	7
Nebraska	4	25			76		0	39	80	19
New Mexico		15		18	52	13	5	14	12	80

June, 1930

	Cases
Anthrax:	
California	1
Actinomycosis:	
California	1
Chickenpox:	
California	941
District of Columbia	92
Maryland	312
North Carolina	228
Virginia	305
Diarrhea:	
Maryland	11
Diarrhea and dysentery:	
Virginia	1,750
Dysentery:	
California (amebic)	4
California (bacillary)	23
Maryland	11
Food poisoning:	
California	33
German measles:	
California	42
Maryland	121
North Carolina	141
Granuloma, coccidioidal:	
California	1
Impetigo contagiosa:	
Maryland	3
Jaundice:	
California	1
Leprosy:	
California	2
Lethargic encephalitis:	
California	4
Mumps:	
California	1,646
Maryland	60
Nevada	12
Ophthalmia neonatorum:	
North Carolina	2
Paratyphoid fever:	
California	10
North Carolina	1
Rabies in animals:	
California	90
Maryland	3
Rocky Mountain spotted or tick fever:	
California	2
Nevada	2
Scabies:	
Maryland	4
Septic sore throat:	
Maryland	4
North Carolina	6
Tetanus:	
California	6
Maryland	1
Trachoma:	
California	8
Maryland	1
Trichinosis:	
California	1
Tularaemia:	
California	2
Nevada	3
Virginia	5
Typhus fever:	
Maryland	11
Nevada	1
Virginia	5
Undulant fever:	
California	13
Maryland	3
Virginia	1
Vincent's angina:	
Maryland	6
Whooping cough:	
California	863
District of Columbia	19
Maryland	195
North Carolina	1,201
Virginia	751

July, 1930

	Cases
Chicken pox:	
Iowa	23
Nebraska	47
New Mexico	16
Dysentery:	
New Mexico (bacillary)	1
Mumps:	
Iowa	32
Nebraska	24
New Mexico	10
Puerperal septicemia:	
New Mexico	1
Rabies:	
Iowa	1
Septic sore throat:	
Nebraska	9
Tetanus:	
Iowa	1
Undulant fever:	
Iowa	15
Whooping cough:	
Iowa	61
Nebraska	60
New Mexico	11

PATIENTS IN INSTITUTIONS FOR THE CARE OF EPILEPTICS, OCTOBER TO DECEMBER, 1929

Reports for the fourth quarter of the year 1929 have been received from 13 institutions for the care and treatment of epileptics, located in 13 States. The total number of patients in these institutions on December 31, 1929, including those on parole or otherwise absent, but still on the books, was 9,324.

The first admissions were as follows:

Month	Male	Female	Total
October, 1929	83	62	145
November, 1929	56	47	103
December, 1929	59	41	100
Total	198	150	348

Of the new admissions during the three months, 56.9 per cent were males and 43.1 per cent were females, the ratio being 132 males per 100 females.

During the quarter 193 patients were discharged—128 males and 65 females. Ninety-one male patients and 65 female patients died. The annual death rates, based on the number of persons on the books of the institutions the middle of November, were: Males, 73.7 per 1,000; females, 58.8 per 1,000; persons, 66.6 per 1,000.

On December 31, 1929, there were 4,920 males and 4,404 females on the books of the institutions, giving a ratio of 112 males per 100 females.

The following table shows for the 13 institutions the number of patients in the hospitals and on parole at the beginning of the quarter and at the end of each month and the percentages of the total patients who were on parole.

	Oct. 1, 1929	Oct. 31, 1929	Nov. 30, 1929	Dec. 31, 1929
Patients in hospitals:				
Male	4,584	4,630	4,631	4,562
Female	4,162	4,204	4,208	4,175
Total	8,746	8,834	8,839	8,737
Patients on parole:				
Male	276	262	273	358
Female	196	178	186	229
Total	472	440	459	587
Total patients on books:				
Male	4,860	4,892	4,904	4,920
Female	4,358	4,382	4,394	4,404
Total	9,218	9,274	9,298	9,324
Per cent of total patients on parole:				
Male	5.7	5.4	5.6	7.3
Female	4.5	4.1	4.2	5.2
Total	5.1	4.7	4.9	6.3

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 94 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,350,000. The estimated population of the 87 cities reporting deaths is more than 29,760,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended July 26, 1930, and July 27, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	585	834	
94 cities	233	410	467
Measles:			
45 States	1,966	2,009	
94 cities	660	418	
Meningococcus meningitis:			
46 States	64	103	
94 cities	31	62	
Poliomyelitis:			
46 States	221	53	
Scarlet fever:			
46 States	782	1,079	
94 cities	302	353	278
Smallpox:			
46 States	382	417	
94 cities	41	49	17
Typhoid fever:			
46 States	830	778	
94 cities	110	105	124
Deaths reported			
Influenza and pneumonia:			
87 cities	336	297	
Smallpox:			
87 cities	0	0	

City reports for week ended July 26, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	1	1	0		0	1	1	1
New Hampshire:								
Concord	0	0	0		0	0	0	0
Manchester	0	0	0		1	0	0	1
Nashua	0	0	0		0	4	0	0
Vermont:								
Barre	0	0	0		0	1	0	0
Burlington	0	0	1		0	0	0	0
Massachusetts:								
Boston	12	23	9		0	55	13	9
Fall River	1	2	0		0	2	4	3
Springfield	1	1	0		0	2	2	0
Worcester	1	1	0		0	8	0	1
Rhode Island:								
Pawtucket	0	0	0		0	0	0	2
Providence	3	3	1		0	9	4	2
Connecticut:								
Bridgeport	0	2	0		0	0	0	0
Hartford	1	2	0		0	1	0	0
New Haven	1	1	0		0	0	0	0

City reports for week ended July 26, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC								
New York:								
Buffalo	5	7	5	----------	0	0	0	5
New York	34	201	44	----------	0	201	17	93
Rochester	3	3	1	----------	0	0	1	4
Syracuse	6	2	0	----------	0	30	0	1
New Jersey:								
Camden	0	3	1	----------	0	8	0	1
Newark	2	7	9	----------	0	9	3	5
Trenton	0	0	0	----------	0	0	0	1
Pennsylvania:								
Philadelphia	13	31	6	5	3	34	25	24
Pittsburgh	4	12	5	----------	0	34	1	13
Reading	0	1	2	----------	0	1	2	3
Scranton	1	2	0	----------	0	0	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	4	4	0	----------	0	10	0	8
Cleveland	31	17	5	----------	0	10	12	8
Columbus	6	2	3	2	2	3	1	0
Toledo	7	3	3	----------	0	1	3	4
Indiana:								
Fort Wayne	0	2	0	----------	0	0	0	0
Indianapolis	2	2	0	----------	0	6	1	5
South Bend	----------	0	----------	----------	----------	----------	----------	----------
Terre Haute	0	0	0	----------	0	1	1	0
Illinois:								
Chicago	32	58	48	2	0	13	34	23
Springfield	0	0	0	----------	0	3	0	0
Michigan:								
Detroit	12	25	17	----------	1	17	11	9
Flint	0	2	0	----------	0	11	1	2
Grand Rapids	1	1	1	----------	1	2	0	0
Wisconsin:								
Kenosha	2	0	0	----------	0	2	3	0
Madison	3	1	0	----------	----------	0	1	----------
Milwaukee	30	8	5	1	1	16	8	4
Racine	4	1	0	----------	0	0	2	0
Superior	7	0	0	----------	0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	1	1	1	----------	0	1	0	1
Minneapolis	3	9	4	----------	0	3	4	2
St. Paul	13	4	1	----------	0	2	0	4
Iowa:								
Davenport	0	1	0	----------	----------	0	0	----------
Des Moines	0	1	0	----------	----------	0	0	----------
Sioux City	0	2	0	----------	----------	0	0	----------
Waterloo	0	0	0	----------	----------	0	0	----------
Missouri:								
Kansas City	----------	2	----------	----------	----------	----------	----------	----------
St. Joseph	0	1	0	----------	0	0	0	1
St. Louis	12	16	5	----------	----------	16	3	----------
North Dakota:								
Fargo	0	0	1	----------	0	0	5	0
Grand Forks	0	0	0	----------	----------	0	0	----------
South Dakota:								
Aberdeen	2	0	0	----------	----------	4	0	----------
Sioux Falls	0	0	0	----------	----------	0	0	----------
Nebraska:								
Omaha	0	2	5	----------	0	2	1	2
Kansas:								
Topeka	0	0	0	----------	1	0	3	0
Wichita	0	1	0	----------	0	9	0	1

City reports for week ended July 26, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0	----------	0	1	0	2
Maryland:								
Baltimore	6	10	8	1	0	1	7	13
Cumberland	0	0	0	----------	0	0	0	0
Frederick	0	0	0	----------	0	0	0	0
District of Columbia:								
Washington	0	4	7	1	1	13	0	9
Virginia:								
Lynchburg	0	1	0	----------	0	0	0	0
Norfolk	1	0	2	----------	1	0	1	3
Richmond	0	2	1	----------	1	2	0	4
Roanoke	0	0	0	----------	0	1	0	1
West Virginia:								
Charleston	0	0	0	----------	0	0	0	2
Wheeling	0	0	0	----------	0	0	0	1
North Carolina:								
Raleigh	0	0	0	----------	0	0	0	0
Wilmington	0	0	0	----------	0	1	0	0
Winston-Salem	5	0	0	----------	0	0	1	2
South Carolina:								
Charleston	0	0	0	4	0	0	0	1
Columbia	----------	0	----------	----------	----------	----------	----------	----------
Georgia:								
Atlanta	----------	2	----------	----------	----------	----------	----------	----------
Brunswick	0	0	0	----------	0	0	0	0
Savannah	0	0	2	1	0	1	1	1
Florida:								
Miami	0	1	0	----------	0	0	2	2
St. Petersburg	----------	0	----------	----------	0	----------	----------	1
Tampa	0	0	1	----------	0	5	0	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	1	----------	0	3	0	4
Tennessee:								
Memphis	0	1	0	----------	0	0	0	1
Nashville	0	1	0	----------	0	0	0	4
Alabama:								
Birmingham	0	1	0	----------	0	6	0	3
Mobile	0	0	2	----------	0	0	0	2
Montgomery	0	0	1	----------	----------	0	0	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0	----------	----------	0	0	----------
Little Rock	0	0	0	----------	0	0	0	2
Louisiana:								
New Orleans	0	5	3	4	3	0	0	9
Shreveport	0	0	0	----------	0	1	1	0
Oklahoma:								
Tulsa	0	0	0	----------	----------	0	0	----------
Texas:								
Dallas	0	3	4	----------	0	1	1	0
Fort Worth	0	0	0	----------	0	0	0	2
Galveston	0	0	0	----------	0	0	0	2
Houston	0	2	1	----------	0	0	0	2
San Antonio	0	1	1	----------	0	0	0	5
MOUNTAIN								
Montana:								
Billings	0	0	0	----------	0	0	0	1
Great Falls	1	0	0	----------	0	1	1	0
Helena	0	0	0	----------	0	1	0	0
Missoula	0	0	0	----------	0	0	0	1
Idaho:								
Boise	0	0	0	----------	0	2	0	0
Colorado:								
Denver	0	7	8	----------	0	4	0	7
Pueblo	2	1	0	----------	0	6	5	0
New Mexico:								
Albuquerque	0	0	0	----------	0	1	0	0

City reports for week ended July 26, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MOUNTAIN—contd.								
Arizona:								
Phoenix	0	0	0	----------	0	0	0	0
Utah:								
Salt Lake City	0	2	0	----------	0	6	3	0
Nevada:								
Reno	0	0	0	----------	0	0	0	0
PACIFIC								
Washington:								
Seattle	8	2	0	----------	----------	22	11	----------
Spokane	1	0	0	----------	----------	8	0	----------
Tacoma	2	2	1	----------	0	7	0	1
Oregon:								
Portland	2	5	1	2	0	5	4	2
Salem	4	0	0	----------	0	0	1	0
California:								
Los Angeles	17	29	11	9	1	37	22	0
Sacramento	1	2	0	----------	0	3	4	1
San Francisco	6	9	2	1	0	4	2	1

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	1	2	0	0	0	1	0	[1] 1	0	3	31
New Hampshire:											
Concord	0	0	0	0	0	1	0	0	0	0	8
Manchester	0	0	0	0	0	1	0	0	0	0	23
Nashua	0	0	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	0	2
Burlington	0	0	0	0	0	0	0	0	0	0	--------
Massachusetts:											
Boston	19	16	0	0	0	16	2	0	0	32	187
Fall River	0	3	0	0	0	2	0	1	0	1	27
Springfield	1	0	0	0	0	1	0	0	0	3	21
Worcester	1	2	0	0	0	3	0	0	0	5	44
Rhode Island:											
Pawtucket	0	2	0	0	0	0	0	0	0	0	15
Providence	2	4	0	0	0	2	0	0	0	17	58
Connecticut:											
Bridgeport	2	1	0	0	0	2	1	0	0	0	28
Hartford	2	0	0	0	0	1	0	0	0	2	39
New Haven	1	0	0	0	0	0	0	1	0	3	32
MIDDLE ATLANTIC											
New York:											
Buffalo	6	7	0	0	0	7	1	0	0	35	121
New York	37	24	0	0	0	115	24	10	3	102	1,541
Rochester	1	1	0	0	0	4	0	0	0	7	69
Syracuse	2	5	0	0	0	0	0	0	0	89	37
New Jersey:											
Camden	0	0	0	0	0	0	1	0	0	0	41
Newark	5	3	0	0	0	7	1	0	0	20	80
Trenton	0	4	0	0	0	3	1	1	0	0	42
Pennsylvania:											
Philadelphia	19	27	0	0	0	28	5	4	1	80	559
Pittsburgh	9	4	0	0	0	6	3	0	0	20	161
Reading	0	0	0	0	0	1	0	0	0	4	44
Scranton	0	1	0	0	0	0	1	0	0	9	--------

[1] Nonresident.

City reports for week ended July 26, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	6	0	1	0	15	2	3	0	4	161
Cleveland	11	17	0	0	0	15	3	5	0	66	196
Columbus	2	0	1	0	0	4	0	0	0	0	97
Toledo	2	0	0	2	0	5	2	0	0	5	81
Indiana:											
Fort Wayne	0	2	0	0	0	0	0	5	0	0	19
Indianapolis	2	1	2	5	0	7	1	1	0	18	91
South Bend	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Terre Haute	1	0	0	1	0	0	0	0	0	0	16
Illinois:											
Chicago	32	50	1	4	0	43	5	2	2	72	637
Springfield	0	0	0	0	0	0	0	0	0	2	16
Michigan:											
Detroit	28	18	0	0	0	21	4	1	0	102	250
Flint	4	5	0	1	0	1	0	0	0	7	16
Grand Rapids	3	5	0	1	0	0	0	2	0	2	27
Wisconsin:											
Kenosha	0	2	0	0	0	0	1	0	0	11	4
Madison	1	1	0	0	-------	-------	0	1	-------	7	-------
Milwaukee	6	10	0	0	0	3	0	0	0	79	92
Racine	1	3	0	0	0	0	0	1	0	11	15
Superior	2	3	0	0	0	1	0	1	0	0	6
WEST NORTH CENTRAL											
Minnesota:											
Duluth	3	0	0	1	0	1	0	0	0	11	25
Minneapolis	11	2	0	1	0	0	1	3	1	0	71
St. Paul	7	1	1	0	0	3	1	1	0	6	49
Iowa:											
Davenport	0	0	0	6	-------	-------	0	0	-------	0	-------
Des Moines	2	2	1	3	-------	-------	0	0	-------	0	28
Sioux City	0	2	0	4	-------	-------	0	0	-------	1	-------
Waterloo	0	0	0	2	-------	-------	0	0	-------	4	-------
Missouri:											
Kansas City	2	-------	0	-------	-------	-------	2	-------	-------	-------	-------
St. Joseph	0	2	0	0	0	1	0	1	0	2	29
St. Louis	6	1	0	0	0	9	5	3	3	6	262
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	3	8
Grand Forks	0	0	0	1	-------	-------	0	0	-------	0	-------
South Dakota:											
Aberdeen	0	0	0	1	-------	-------	0	2	-------	2	-------
Sioux Falls	0	0	0	1	-------	-------	0	0	-------	0	9
Nebraska:											
Omaha	1	2	0	2	0	1	0	15	0	2	72
Kansas:											
Topeka	1	3	0	0	0	0	0	1	0	15	20
Wichita	1	1	0	0	0	0	2	1	0	0	32
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	2	0	0	0	0	0	0	0	4	30
Maryland:											
Baltimore	6	4	0	0	0	19	6	2	1	37	286
Cumberland	0	0	0	0	0	0	0	0	0	0	10
Frederick	0	0	0	0	0	0	0	0	0	0	-------
District of Columbia:											
Washington	4	2	0	0	0	15	3	1	0	8	182
Virginia:											
Lynchburg	0	0	0	0	0	0	1	4	0	2	15
Norfolk	0	0	0	1	0	0	2	8	0	0	-------
Richmond	2	4	0	0	0	3	2	0	0	0	79
Roanoke	0	1	0	0	0	3	0	1	0	0	-------
West Virginia:											
Charleston	0	0	0	0	0	1	1	1	0	12	18
Wheeling	1	1	0	0	0	0	0	0	0	0	15
North Carolina:											
Raleigh	0	0	0	1	0	0	0	0	0	0	18
Wilmington	0	1	0	0	0	0	0	0	0	23	16
Winston-Salem	0	2	0	0	0	1	1	0	0	5	20

City reports for week ended July 26, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC—continued											
South Carolina:											
Charleston	0	0	0	0	0	1	1	4	0	0	40
Columbia	0		0				1				
Georgia:											
Atlanta	1		1				2				
Brunswick	0	0	0	0	0	0	1	0	0	0	
Savannah	0	1	0	0	0	0	2	4	0	0	21
Florida:											
Miami	0	0	0	0	0	3	1	0	0	0	27
St. Petersburg	0		0		0	2	0		1		11
Tampa	0	0	0	0	0	3	0	0	0	0	26
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	1	0	0	0	0	0	0	1	0	
Tennessee:											
Memphis	1	1	0	0	0	4	9	9	0	0	63
Nashville	0	2	1	3	0	4	6	0	0	1	53
Alabama:											
Birmingham	1	3	1	0	0	5	5	2	0	6	64
Mobile	0	0	0	0	0	0	1	0	0	0	27
Montgomery	0	1	0	0			2	0		0	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0			1	0		3	
Little Rock	0	0	0	0	0	1	1	1	0	0	
Louisiana:											
New Orleans	3	7	0	0	0	12	4	3	1	4	121
Shreveport	0	0	0	0	0	2	1	0	0	0	24
Oklahoma:											
Tulsa	0	2	0	0			2	4		4	
Texas:											
Dallas	1	5	0	0	0	1	3	3	0	4	55
Ft. Worth	1	0	1	0	0	1	1	0	0	0	32
Galveston	0	0	0	0	0	1	0	0	0	0	13
Houston	1	0	0	1	0	4	1	3	0	0	52
San Antonio	1	1	0	0	0	6	2	1	1	0	71
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	2	4
Great Falls	0	1	0	0	0	0	1	0	0	0	7
Helena	0	0	0	0	0	0	0	1	0	4	2
Missoula	0	0	0	0	0	1	0	0	0	0	11
Idaho:											
Boise	0	0	1	0	0	1	0	1	0	1	5
Colorado:											
Denver	3	1	0	1	0	3	1	0	0	36	66
Pueblo	1	0	0	0	0	0	0	0	0	7	10
New Mexico:											
Albuquerque	0	0	0	0	0	2	0	0	0	0	7
Arizona:											
Phoenix	0	1	0	0	0	1	0	0	0	0	17
Utah:											
Salt Lake City	1	1	0	0	0	1	1	0	0	32	20
Nevada:											
Reno	0	0	0	1	0	0	0	0	0	0	8
PACIFIC											
Washington:											
Seattle	2	5	1	2			0	1		17	
Spokane	0	0	0	3			0	0		7	
Tacoma	0	2	1	2	0	0	0	0	1	2	27
Oregon:											
Portland	1	0	5	3	0	1	1	0	0	10	59
Salem	0	0	0	0	0	0	0	0	0	13	
California:											
Los Angeles	11	6	7	1	0	19	3	2	1	41	209
Sacramento	1	1	0	0	0	3	0	1	0	1	24
San Francisco	5	5	0	3	0	7	2	1	0	0	141

City reports for week ended July 26, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	1	0	0	0	0	0	1	3	0
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	1	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	0	0	0	0	0	2	0
New York [1]	7	6	0	2	0	0	12	2	1
Syracuse	0	1	0	0	0	0	0	6	0
New Jersey:									
Newark	2	1	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	1	0	0	0	4	1	0	1	1
EAST NORTH CENTRAL									
Ohio:									
Cleveland	0	0	0	0	0	0	0	1	0
Toledo	1	0	1	1	0	0	0	1	1
Indiana:									
Indianapolis	2	0	0	0	0	0	0	0	0
Illinois:									
Chicago	2	1	1	0	1	1	2	0	0
Michigan:									
Detroit	7	1	1	0	0	0	1	0	1
Grand Rapids	0	0	0	0	0	0	0	1	0
Wisconsin:									
Milwaukee	1	1	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	0	0	0	0	0	0	1	0
Missouri:									
St. Louis	0	1	0	1	0	0	0	0	0
Kansas:									
Wichita	0	0	0	0	0	0	0	0	1
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	1	1	1	0	0	1	1	0
Virginia:									
Norfolk	1	0	0	0	0	0	1	3	0
Richmond	0	1	0	1	0	0	0	1	0
North Carolina:									
Raleigh	0	0	0	0	0	1	0	0	0
Wilmington	0	0	0	0	1	0	0	0	0
Winston-Salem	0	0	0	0	9	2	0	0	0
South Carolina:									
Charleston	0	0	0	1	3	2	0	0	0
Georgia:									
Savannah [1]	0	0	0	0	2	0	0	0	0
Florida:									
Tampa [1]	0	0	0	0	1	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	3	0	0	0	0	1	0	0	0
Alabama:									
Birmingham	0	0	1	0	0	1	0	0	0

[1] Typhus fever, 3 cases: 1 case at New York City, N. Y., 1 case at Savannah, Ga., and 1 case at Tampa, Fla.

City reports for week ended July 26, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
New Orleans	0	0	0	0	1	0	1	0	0
Shreveport	0	0	0	1	0	1	0	4	0
Texas:									
Dallas	0	0	0	0	2	2	0	5	1
Fort Worth	0	0	0	0	0	1	1	0	0
San Antonio	0	0	0	0	0	0	0	0	1
MOUNTAIN									
Utah:									
Salt Lake	1	1	0	0	0	0	0	0	0
PACIFIC									
Oregon:									
Portland	0	0	1	2	0	0	0	0	0
California:									
Los Angeles	0	0	0	0	0	0	1	40	2
Sacramento	1	0	0	0	2	0	0	0	0
San Francisco	1	1	0	0	0	0	0	2	0

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended July 26, 1930, compared with those for a like period ended July 27, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, June 22 to July 26, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929
98 cities	67	110	59	89	59	88	[2] 49	73	[3] 39	68
New England	62	94	51	70	38	79	33	83	22	58
Middle Atlantic	65	144	59	101	52	99	48	76	35	75
East North Central	98	131	91	128	87	119	66	105	[4] 50	103
West North Central	70	85	36	77	66	69	38	54	[5] 38	21
South Atlantic	24	34	24	34	29	43	[6] 43	30	[7] 39	28
East South Central	13	34	40	27	27	41	13	27	27	27
West South Central	37	69	52	72	64	84	[8] 38	69	34	99
Mountain	0	26	9	26	26	26	69	17	69	9
Pacific	64	84	38	43	61	41	38	41	33	31

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1930, and 1929, respectively.
See end of table for other footnotes.

Summary of weekly reports from cities, June 22 to July 26, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

MEASLES CASE RATES

	Week ended—									
	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929
98 cities	500	267	276	195	257	150	[3] 151	98	[3] 110	69
New England	762	211	498	209	421	186	235	146	175	101
Middle Atlantic	640	99	339	76	322	51	205	47	152	27
East North Central	334	620	170	474	155	351	71	210	[4] 60	149
West North Central	264	256	137	114	127	104	57	52	[5] 73	58
South Atlantic	234	137	165	73	130	49	[6] 114	43	[7] 52	17
East South Central	256	7	142	27	202	14	47	7	61	7
West South Central	19	156	26	69	19	61	[8] 11	4	7	27
Mountain	1,416	148	712	148	566	104	240	61	172	70
Pacific	931	208	527	138	562	152	361	109	191	77

SCARLET FEVER CASE RATES

	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929
98 cities	109	112	77	88	72	83	[3] 54	64	[3] 50	59
New England	124	119	66	90	66	83	60	56	66	56
Middle Atlantic	89	72	57	46	51	41	37	35	36	19
East North Central	184	191	116	173	115	160	87	103	[4] 77	110
West North Central	97	104	102	38	83	79	42	54	[5] 31	77
South Atlantic	62	62	57	60	62	64	[6] 45	69	[7] 37	60
East South Central	61	34	13	55	47	48	20	55	54	27
West South Central	41	42	49	23	37	42	[7] 23	72	49	57
Mountain	60	70	163	44	86	35	77	78	26	26
Pacific	57	164	45	135	50	89	57	65	45	65

SMALLPOX CASE RATES

	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929
98 cities	13	15	7	15	7	8	[3] 6	13	[3] 7	8
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	10	38	5	41	9	19	10	32	[4] 8	16
West North Central	51	19	13	13	9	15	13	21	[5] 22	21
South Atlantic	9	2	2	2	0	2	[6] 4	2	[7] 2	0
East South Atlantic	7	7	20	21	20	7	0	7	20	7
West South Central	22	4	0	11	7	15	[8] 8	0	4	8
Mountain	51	113	51	35	9	35	17	44	17	9
Pacific	50	14	38	24	43	10	21	34	26	22

TYPHOID FEVER CASE RATES

	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929
98 cities	13	12	10	10	16	14	[3] 15	18	[3] 18	18
New England	9	9	7	4	4	4	9	9	7	29
Middle Atlantic	5	7	6	6	10	7	4	10	7	7
East North Central	10	3	1	4	6	7	9	8	[4] 13	8
West North Central	13	15	8	13	9	10	23	19	[5] 56	18
South Atlantic	37	30	26	32	55	7	[6] 37	32	[7] 35	37
East South Central	67	34	94	48	94	157	67	144	74	108
West South Central	34	34	49	8	37	84	[8] 61	57	41	69
Mountain	34	52	0	17	0	9	26	52	17	44
Pacific	5	19	5	7	17	2	19	5	12	7

See end of table for footnotes.

Summary of weekly reports from cities, June 22 to July 26, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

INFLUENZA DEATH RATES

	Week ended—									
	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929
91 cities	3	5	4	2	4	3	[6] 3	3	[3] 3	3
New England	0	2	2	0	0	2	0	0	0	2
Middle Atlantic	2	4	4	3	4	2	3	2	1	2
East North Central	3	4	2	1	3	3	2	3	[4] 3	4
West North Central	0	0	0	0	6	0	0	3	[5] 4	3
South Atlantic	5	4	5	2	2	4	[6] 0	6	[7] 4	4
East South Central	15	15	7	15	15	7	0	0	0	0
West South Central	11	4	15	4	8	4	11	20	11	4
Mountain	0	44	0	0	0	26	9	0	0	9
Pacific	3	3	9	0	3	0	6	3	3	0

PNEUMONIA DEATH RATES

	June 28, 1930	June 29, 1929	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929
91 cities	68	64	55	63	54	55	[6] 44	55	[3] 56	49
New England	49	58	29	49	40	29	35	70	40	31
Middle Atlantic	75	65	58	67	57	62	56	65	72	57
East North Central	56	69	41	56	38	50	32	40	[4] 37	38
West North Central	86	48	62	63	74	51	38	36	[5] 42	51
South Atlantic	66	62	55	69	55	58	[6] 47	54	[7] 76	60
East South Central	103	75	162	75	81	30	59	52	103	52
West South Central	92	66	84	109	84	82	50	27	77	86
Mountain	77	104	60	61	103	44	51	96	77	61
Pacific	55	38	64	31	61	53	18	63	9	25

[2] Columbia, S. C., and Fort Smith, Ark., not included.
[3] South Bend, Ind., Kansas City, Mo., Columbia, S. C., and Atlanta, Ga., not included.
[4] South Bend, Ind., not included.
[5] Kansas City, Mo., not included.
[6] Columbia, S. C., not included.
[7] Columbia, S. C., and Atlanta, Ga., not included.
[8] Fort Smith, Ark., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended July 26, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases from eight Provinces of Canada for the week ended July 26, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia		2		1		
New Brunswick						7
Quebec	1					10
Ontario	4	2	1	5	10	3
Saskatchewan				3	3	1
Alberta	1			1	2	
British Columbia	2	9			1	2
Total	8	13	1	10	16	23

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended July 26, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended July 26, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	6
Chicken pox	5	Scarlet fever	30
Diphtheria	27	Tuberculosis (pulmonary)	27
Erysipelas	1	Tuberculosis (other forms)	1
Influenza	1	Typhoid fever	10
Measles	50	Whooping cough	18

DENMARK

Communicable diseases—May, 1930.—During the month of May, 1930, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	7	Mumps	1,450
Chicken pox	61	Paratyphoid fever	5
Diphtheria and croup	364	Poliomyelitis	1
Erysipelas	232	Puerperal fever	21
German measles	10	Scarlet fever	116
Influenza	3,152	Typhoid fever	1
Lethargic encephalitis	10	Undulant fever (Bac. abort. Bang)	58
Measles	2,063	Whooping cough	1,195

VIRGIN ISLANDS

Communicable diseases—June, 1930.—During the month of June, 1930, cases of certain communicable diseases were reported in the Virgin Islands as follows:

	Cases
St. Thomas and St. John:	
Chicken pox	1
Gonorrhea	2
Pellagra	1
Syphilis	2
Tuberculosis	1
St. Croix:	
Gonorrhea	3
Syphilis	1
Tuberculosis	1
Uncinariasis	2

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26	Aug. 2, 1930
Afghanistan	C														[1] P			
China:																		
Canton	C						1	1	1		2				2	1		
Manchuria—Dairen	C		1															
Swatow	C								3	4	3							
India	C	6,461	5,914	10,817	41,462	15,596	14,600	12,468	13,647	10,088								
	D	3,606	3,371	5,866	27,906	12,782	11,882	9,756	10,458	7,802								
Bassein	C				7	3	4											
	D				5	3	2											
Bombay	C			4														
Calcutta	C	202	269	354	647	194	175	142	98	78	73	94	77	81	53	49		
	D	110	153	220	414	125	107	83	57	44	36	36	63	54	28	23		
Negapatam	C	12									1							
	D	4									1							
Rangoon	C	3	3	2	1		5	2	2	1	1	2	2	1				
	D	3	1	2	1		1		2	1	1	1	1	1				
Tuticorin	C	3																
	D	1																
India (French):																		
Chandernagor	C		4	1	6	2	2	2				1	2					
	D		2	3	5	1	4	1				1	1					
Karikal	C		4	12	1								3					
	D		1	9	1								3					
Indo-China (see also table below):																		
Pnompenh	C	11	9		2	1				5	10	11	14	9	16	7		
	D	8	7	6			2	2	1	1	4	7	6	6	9	5	2	
Saigon and Cholon	C	2	5	14	76	59	40	48	13	17	19	7	5	7	1	1	1	
	D	2	4	6	55	43	27	24	7	11	10	2		3				
Philippine Islands: [2]																		
Ports—																		
Cebu	C												1	20	13	13	9	5
	D													9	7	12	8	4

Iloilo	C														1	11	17	9
	D															9	13	10
Manila	C								1									
Provinces—																		
Antique	C																	14
	D																	7
Bulacan	C									1			2				3	
	D									1								
Capiz	C																3	1
	D																2	1
Cebu	C									4	21	92	132	241	205	121	57	63
	D									4	10	42	65	45	78	61	35	37
Iloilo	C												1	1	3	75	66	250
	D													1	3	54	49	146
La Union	C														1			
Leyte	C											1	15	20				
	D												11	9				
Masbate	C												10	20	25	8	20	37
	D												3	4	15	2	4	18
Misami	C														2			
	D														2			
Negros, Occidental	C								10	3	11	19	11	7	90	193	165	178
	D								7	3	4	18	4	9	48	134	104	118
Negros, Oriental	C																17	9
	D															1	9	3
Nueva Ecija	C																1	
	D																1	
Pampanga	C											1	1	2				
Pangasinan	C													2		1		
Rizal	C									1								
	D									1								
Tarlac	C																	2
Siam	C	3	7	1	29	12	4	13	4			6						
	D		4		13	10	2	7	2			4						
Bangkok	C	3	2	2	15			6	3	5	3	3	1		3	4	1	
	D			1	4			2	1		3		2		1	1	1	
Nagara Pathom	C		1		10													
	D		1		2													
Songkla	C														8		2	
	D														4		2	
On vessel:																		
S. S. at Suva, Fiji Islands	C		1															
S. S. Sutley, at Batavia, from Calcutta	C		1															
S. S. Sassari, at Massoua, from Jeddah	C								1									
	D								1									
On small boat at Port Cebu, from Bantayan Island	C									1								
	D									1								

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

[2] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		December, 1929	January, 1930	February, 1930	March, 1930			April, 1930			May, 1930			June, 1930	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):															
Annam [1]	C		1	4		52				60		20	3	2	14
Cambodia [1]	C	41	147	90	49	32		18	6		5	31	52	56	88
Cochin-China [1]	C	46	177	65	5	22	55	48			188	224	259	147	126

[1] Reports incomplete.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26
Algeria:																	
Algiers	C														1	2	
Constantine	C									1				1			
Oran	C															2	
Argentina:																	
Andalgala [1]																	
Rosario	C	P															
Santa Fe	C	6															
Villa Lia	D		2														
Azores: Ponta Delgada	C				8												
	D				5												
Belgian Congo	C													2			
	D													2			
Brazil:																	
Rio de Janeiro	C	1															
	D	1															
Sao Paulo. [2]																	
British East Africa (see also table below):																	
Tanganyika	C		7		44												
	D				20												
Uganda	C	82	47	98	117	54	89		84	121							
	D	70	43	87	105	48	75		72	75							
Ceylon:																	
Colombo	C	4	3	4	1	4	1		1	1				1	2		
	D	4	3	4	1	3	1		1	1				1	2		
Plague-infected rats		1	3	2	4					1							
Chile: Antofagasta	C	1	1	1	1												
	D			2	1												
Dutch East Indies:																	
Batavia and West Java	C	167	153	124	87	18	33	17	14	19	27						
	D	164	150	122	81	18	33	17	14	19	27						
Plague-infected rats		3	3	3	8			3	2	3	1						
Celebes—Makassar	C	1															
	D	1															
Java and Madura	D	317	296	223	173	28	74	36	48	40							

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.
[2] 21 cases of plague with 8 deaths were reported Jan. 29, 1930, in the State of Sao Paulo, Brazil; 15 of these cases were in the city of Sao Paulo.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930 10	17	24	31	June, 1930 7	14	21	28	July, 1930 5	12	19	26
Ecuador (see table below).																	
Egypt:																	
Alexandria	C	4	1	4	2	2	3	3	5	3	6	6	4	8	8	3	4
	D	1		1	2			1	2	2		2	5	2	3	2	3
Assiout	C				14	3	9	2	6	4	2	3		1	1		
	D				5		3	1	1		1		2	1	1		
Beheira	C	2		4													
Beni-Suef	C			4													
Dakahlieh	C		8	5	5	3	1	2	5	1							
	D			1			1	1									
Gharbieh	C	1			1												
	D				1												
Girga	C				1										1		
Minieh	C							6	1	1	1	4	4	2	1		
	D								1		1						
Port Said	C				1		1	1		1			1				1
France: St. Ouen	C															1	
	D															1	
Greece (see also table below):																	
Patras	C			1								1				1	
Piraeus	C	1															
Pyrgos	C			1													
Hawaii Territory, Hamaqua, Hawaii: Plague-infected rats												1					
India	C	4,814	5,639	4,087	2,215	281	188	117	62	55							
	D	3,308	3,940	3,344	1,960	271	205	103	56	42							
Bassein	C	1		3													
	D	1		1													
Bombay	C	1	1	7	4	4	1		1	1		2					1
	D	1	1	5	8	1	4					1	1				1
Plague-infected rats		28	31	86	108	23	39		19	6	7	8	5	13	14	10	
Madras Presidency	C	27	230	157	44	2		6	30	26	10	2			1		
	D	13	140	87	19		1	4	6	15	2				1		
Rangoon	C	3	7	3	5		1	3				1	1				2
	D	2	6	3	4	1	1	1					1				2
Plague-infected rats		1	7	3	4	1	3	1						2	2		

India (Portuguese)	D																
Indo-China (see also table below):																	
Pnompenh	C	1			3	1			2	6					1		
	D	2	13	13	4			1		5	1		1			1	
Saigon and Cholon	C	2		1		1				1		1					
	D	2		1								1					
Iraq: Baghdad	C	6	6	7	6	7	11	7	12	12	4	8	4	10	4	2	2
	D	2	1	4	2	3	5	4	6	7	3	5		5		1	1
Japan: Osaka (vicinity of)—Plague-infected rats		7	6	4	3												
Kwang-Chow-Wan	C	25	25	7	37		20		14	23		8					
Madagascar (see also table below): Tamatave	C				1					1							
Morocco	C	4	48	55	121	19	22	18	12	2		1					
	D		13	18	45	11	14	6	3	4							
Nigeria: Lagos	C	6	7	13		1	1			1		3	1	1			
	D	6	7	5		1	1			1		3	1	1			
Plague-infected rats		44	42	25	7	2	6	5	4	1							
Senegal (see table below).																	
Siam	C	8	17	16	5		1	1	3								
	D	6	13	15	6		1		3								
Bangkok	C		1	5			1	1	3								
	D		1	4			1		3								
Nagara Pathom	C	7	5	1	10												
	D	7	6	1	9												
Nagara Rajsima	C	2	2	1	1												
	D			1	1												
Syria: Beirut	C										2	1	1		2	4	3
Tunisia:																	
Sfax district	C	18	22		1	17			4	6		3					
Tunis	C	6	5	1	4				1		1				1	4	
	D									1					1		
Union of Socialist Soviet Republics:																	
Salsk Region	C									1			1				
	D									1							
Stavropol Region	C									1							
	D									1							
Union of South Africa:																	
Cape Province	C	1	2	1		P				1							
	D		1	1													
Orange Free State	C	15	11	5	1												
	D	9	3	3													
Transvaal	C	8	2	1													
	D	3		1													
On vessel:																	
At Rio de Janeiro, Brazil, from Argentina	C	1															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
British East Africa (see also table above):							
Kenya	C	34	69	85	16	171	75
Uganda	C	184	109				
	D	155	90				
Ecuador: Guayaquil	C	4	2	2	0		
	D	2	2		0		
Plague-infected rats		4	2	2	0		
Ecuador (outside of Guayaquil)	C	4					
	D	2					
Greece (see also table above)	C				1		1
Indo-China (see also table above)	C	10	30	27	4		11
Madagascar (see also table above)	C	282					
	D	258					
Ambositra Province	C	128	49	25	14		
	D	111	41	20	12		
Antisirabe Province	C	26	22	38	46		
	D	25	22	36	45		
Itasy Province	C	31		4			
	D	31		4			
Miarinarivo Province	C		25	14	1		
	D		25	14	1		
Madagascar (see also table above)—Con.							
Moramanga Province	C	22	7	5	3		
	D	21	4	5	3		
Tamatave Province	C	3					
	D	1					
Tananarive Province	C	88	110	52	39		
	D	83	107	52	38		
Senegal:							
Baol [1]	C			18	24	13	2
	D			8	12	11	2
Dakar [1]	C				2	52	53
	D				2	42	117
Louga [1]	C		2		33	54	60
	D				10	27	21
Thies [1]	C	3		3	12	21	52
	D			2	9	8	35
Tivaouane [1]	C	1		11	71	135	43
	D			8	38	69	28

[1] Incomplete reports.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930				June, 1930				July, 1930				Aug. 2, 1930
						10	17	24	31	7	14	21	28	5	12	19	26	
Algeria:																		
Algiers	C	6	1	5	1		1		2									
Constantine	C	1										1				1		
Oran	C	5		1														
Arabia: Aden	C	1	2	3	1									1				
Bolivia: La Paz.[1]																		
British Borneo: Sarawak	C	4	19															
British East Africa (see also table below):																		
Tanganyika	C	5	49	103	57	33	45	55	276	385	755							
	D		8	7	14	3	5	8	54	154	90							
British South Africa:																		
Northern Rhodesia	C			9	1			57	2									
	D				2			9										
Southern Rhodesia	C	1	6		66	53		42	60	75	1							
	D				1	4		8	1									
Canada:																		
Alberta	C	22	4	10	4										2	1	2	
Edmonton	C	19	1	4	3													
British Columbia—Vancouver	C	16	16	20	17			2	2	1	1			2	2		1	
Manitoba	C	6	2	4	4			7	3			4						
Ontario	C	63	86	100	77	14	24	24	20	14	10	13	10	3	5	6	10	
Fort William	C	4																
North Bay	C	2	1			1												
Ottawa	C	10	11	19	21	3	10	7	5	6		8	1	1	1	4	7	5
Toronto	C	2						3	1	2	1	1			1			
Quebec	C	11											4	3				
Montreal	C	1																7
Saskatchewan	C	86	76	47	41	20	6	10	3		12	10			2		3	
Regina	C					1		3										
Ceylon:																		
Angoda, Western Province	C		10		6													
	D		1		2													
Colombo	C	1	3															
	D		2															

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26	Aug. 2, 1930
China:																		
Canton	C	7	11	6	3					1								
	D	2	3	2	3													
Chungking	C	P	P		P	P		P	P	P			P					
Foochow	C	P	P		P		P		P		P		P					
Hong Kong	C	118	62	38	18	5	5	2		2	1	1			2			
	D	109	51	25	23	4	2	3		1		1	1		1			
Manchuria—																		
Harbin	C	3			1		10	10										
Kwantung—Dairen	C	6	5		2	1		7			11	5		8				
	D							4				1						
Nanking	C	P	P	P	P	P			P	P	P							
Shanghai—																		
Foreigners only	C	5	2	2	3		1	1		1	1	1	2	1		1		
Including natives	D	8	7	10	10		1	2	2	1		1	1					
Swatow	D	3	6	6	3	1		1	4	1		1	2	1				
Tientsin	C	1	1	2	2	1												
Chosen (see table below).																		
Colombia:																		
Baranquilla	C		102	2	1													
Buenaventura	C		1		15	2		1	1	1	1		4	4	3			
Costa Rica:																		
Port Limon	C				6				2	2								
San Jose [2]	C			10	7													
Curacao (alastrim)	C			14	2	2					1			2				
Dahomey (see table below).																		
Dutch East Indies:																		
Borneo	C	1		185	90		10	4	2	2	10				2			
	D	1		12	31	1					1							
Java—																		
Batavia and West Java	C	14	14	78	64	1	1	5	5	1	4			3	1	3		
	D	7	7	6	11	1	1	3	2		1			2	1			
East Java and Madura	C				4											1		
Sanggi Islands	C	25	12	5	160	14	12											
	D			1	24	1	4											
Sumatra	C	2		48														
	D			5														

Egypt: Port Said	C	2			1		1								2			
Great Britain:																		
England and Wales	C	1,455	1,530	1,700	1,427	462	324	304	327	237	266	241	182	156	138	126		
Ashton under Lyne	C	4	29	15	18	6	3	4	4			3	4		4	2		
Bradford	C	5	2		3		1		1					1				
Cardiff	C			2	3									2				
Leeds	C	6	11	16	2									1				
London	C	597	699	710	602	222	138	148	129	130	136	125	107	84	52	62		
London and Great Towns	C	1,101	1,156	1,239	1,066	339	250	235	254	197	208	190	158	127	96	102		
	D	2	5	3	3													
Sheffield	C			8	2													
Stoke-on-Trent	C	12	41	122	85	19	9	13	21	3	10	15	4	3	2	1		
Scotland	C									1		3			1			
	D														1			
Hedjaz	C	11																
India	C	26,524	36,036	39,329	34,843	6,533	6,549	5,416	4,337	3,686								
	D	6,186	7,710	9,109	6,983	1,449	1,814	1,196	993	1,065								
Bombay	C	342	638	718	430	52	68	58	40	36	35	23	19	17	15	11		
	D	164	314	431	270	33	49	44	35	27	23	19	10	13	9	9		
Calcutta	C	185	399	361	495	109	70	52	71	46	45	45	25	27	19	13		
	D	130	287	305	403	94	72	40	52	50	37	29	30	17	17	12		
Cochin	C	234	184	291	183	13	8	7	9	4	1	10	1			4		
	D	27	29	35	13	5	1	2		2	1	1						
Karachi	C	30	38	33	30		6	7	1	5		1	1					
	D	9	16	47	17	2		1	1	2		1						
Madras	C	105	159	173	133	24	13	15	20	9	10	8	8	6	10	17		
	D	16	29	36	27	4	5	6		6	3	1		4	1	3		
Moulmein	C	65	143	146	43	27	29	20	13		9	6	6	4	10	3		
	D	18	40	41	7	4	6	5	6		3	3	1	3	4	1		
Negapatam	C		1					1			1		1			1		
Rangoon	C	7	7	10	4	2		3	1	1	5	1	2	2	1	1		
	D	4	2	5		1						1	1					
Tuticorin	C	3						5				1						
Vizagapatam	C	5	9	69	6	3	1	1			1							
	D		1	18	2		3											
India (French):																		
Chandernagor	C	3	11	6	10	6	2	8	8	4	8	5	2		1			
	D		5	2	2	2	4	1				2	1		1			
Karikal	C	3	12	24	19	6	5	1		4	3	1	3	1				
	D	3	8	7	8	2	1			2	2	1	3	1				
Pondicherry Province	C	22	52	21	24	9	13	10	8	4	4	9	6	4	9			
	D	19	40	13	20	7	12	10	7	4	4	9	6	3	9			
India (Portuguese)	C	16	50	38	44	2	27	5	13		3	18	7					
	D		5	2	8		3	1	4		2	2	6					
Indo-China (see also table below):																		
Pnompenh	C					1		1	1							1		
	D	1			2					1						1		
Saigon and Cholon	C	3	4	3	5	1	1		1	1								
	D	3	2	1	5		1		1									

[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	Aug. 2, 1930
Iraq:																		
Baghdad	C	7	3		8	1				1				1				
	D	3	1		1	1												
Basra	C		1		1													
Mossoul Liwa	C	26	12		22	13		8			1		3	47	20			
	D	7	2		3	2		1			1			19	1			
Ivory Coast (see table below).																		
Jamaica (alastrim)	C								2									
Japan: Tokyo	C				1													
	D				1													
Macao	D		2	3	2	1												
Mexico (see also table below):																		
Jalisco (State): Guadalajara	D	9	14	22	20			6	1	4		5	6	3	1			
Juarez	C	2	3	2								6						
	D	1	1									1						
Mexico City and surrounding territory [3]	C	30	38	106	99	30	15	17	18	17	23	20	17					
	D	7	21	31	47	6	12	8	6	5	4	3	5					
Morelos State.[4]																		
Progreso	C							1										
	D							1				1						
San Luis Potosi	C		1															
	D		1															
Morocco (see table below).																		
Nigeria (see also table below): Lagos	C	5	2	1	1								1					
	D	2																
Persia (see table below).																		
Philippine Islands: Sarangani and Balut Islands [5]	D	18	3															
Poland	C		2		7		1		2									
Portugal: Lisbon	C	4	7	7	8	6		2		1		2	7		7			
Rumania	C	1	1	2														
Siam	C		2		8	2												
	D	1			4													
Somaliland, British: Boales	C	35	19	2														
	D	8	2	6														
Spain	C										4		8		1			
Straits Settlements	C	2		5	5	1	3	2	5	5		1	3	1	2	7	1	
	D	1		1	2		1	1	1	1		1		1	1	1		
Sudan (Anglo-Egyptian)	C	230	79	60	42		5	13	1	4	8	1	54	8	1		3	
	D	34	6	5	4			1	1				3		1			

Sudan (French) (see table below).																		
Syria (see table below).																		
Taiwan: Taihoku (see table below).																		
Tunisia: Tunis	C	7	3	3	4		1		1			2						
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P									
Orange Free State	C	P	P	P														
Transvaal	C	P	P	P														
Upper Volta	C		26	2	3				1				5					
Zanzibar	C			13														
On vessel:																		
S. S. Tairoa, at Liverpool, from London	C		1															
S. S. Karagola, at Zanzibar, from India	C	4																
S. S. Karagola, at Lourenco Marques, from India	C		1															
S. S. Elysia, at Port Sudan, from Bombay	C				1													
S. S. Naldera, at Port Said	C					1												
S. S. Manoa, from Honolulu to San Francisco	C												1					

Place		December, 1929	January, 1930	February, 1930	March, 1930			April, 1930			May, 1930			June, 1930	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Belgian Congo	C	74													
	D	4													
Dahomey	C	19													
Indo-China (see also table above)	C	142	460	434			26	261				173	132	80	133
Ivory Coast	C					7									
Sudan (French)	C	17	229	213		200	409	371		150	40	56	178	76	
	D		25	11		18	31	30		6	7	7	18	18	
Syria: Beirut	C	25	70	18	4	8	5	10	2	7			7	6	1
Taiwan: Taihoku	C			43	31	12	15	10	2						

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
British East Africa (see also table above):							
Kenya	C	168	12	12	175	174	
Uganda	C		184	109			78
	D		155	99			69
Chosen	C		1	4		5	
	D			1		1	
France	C	9	9	23	8		3

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
Mexico: Durango (see also table above)	D	4	12	6	5	4	4
Morocco	C	84	29	74		10	18
Nigeria (see also table above)	C	293					
	D	70					
Persia	C	P					
Turkey	C	883	215	114		3	16
	D	457	66	42			

[3] During the month of March, 1930, 100 cases of smallpox were reported in Mexico City, Mexico, and surrounding territory.
[4] Newspaper reports of Feb. 4 show an epidemic of smallpox in Ionacatepec, Morelos State, Mexico, and vicinity, giving 600 deaths in preceding 2 weeks.
[5] On Feb. 1, 1930, 317 cases of smallpox with 102 deaths were reported to that date in the Sarangani and Balut Islands.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Week ended— April, 1930			May, 1930					June, 1930				July, 1930		
					12	19	26	3	10	17	24	31	7	14	21	28	5	12	19
Algeria:																			
Algiers	C	3	4	6	2	3	2	1	1	2	4	8	2		1			1	2
Constantine Department	C	4	5	11	4	9	2			4		2	11		1			1	1
Oran	C	2										3				4		2	1
Arabia: Aden	C			1															
	D			1															
Bolivia: La Paz.[1]																			
Brazil: Porto Alegre	C		2						1										
Bulgaria	C		13	9	15				1		5		1		9	6		4	5
	D		1		1				1		1		1						1
Sofia	C	1																	
Chile:																			
Talcahuano	D	1																	
Valparaiso	C	1																	
China:																			
Manchuria—Harbin	C		1	4	5		20	27											
Shanghai	C			1															
Tientsin	C	1																	
Chosen (see table below).																			
Czechoslovakia (see table below)																			
Egypt:																			
Alexandria	C						1								1		1		
Beheira Province	C	14	18	2			2		9	21	9	10	17	16	7	5		5	
	D		5						4	4	4	1	1	1		2		1	
Cairo	C		1																
Port Said	C	2	1																
Suez	C	1																	
Great Britain: Scotland—																			
Dunfermline	C																	1	
Glasgow	C									1									
	D									1									
Greece (see table below).																			
Iraq: Baghdad Liwa	C			2															
Ireland:																			
Irish Free State—																			
Ballina—Mayo County	C											2		1				1	
Dingle—Kerry County	C						3	2											
Mohill—Leitrim County	C															9			
Roscommon—Roscommon County	C																		1

Strokestown—Roscommon County	C																		1
Shillelagh—Wicklow County	C													1		3	1		1
Swinford—Mayo County	C									7	7								
Westport—Mayo County	C																		2
Northern Ireland—Cookstown	C		3																
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico: Mexico City, including municipalities in Federal District	C	12	9	4	2	1		1		2		4	2	3	1	3	2		
	D	4		1	2	1		1				3		1					
Morocco	C	23	21	38	6	5	3	1	3	6	1	1	1		6	8		4	3
	D			7	2	1													
Palestine	C		1	6		1				2			2				3	1	1
Poland	C	296	183	228	59	64	53	67	64	45	34	28	39	15	26	37		24	
	D	21	8	13	4	2	3	6	2	2		1	3	3	2	3		4	
Portugal:																			
Lisbon	C							4											
Oporto	C		1	2	1														
Rumania	C	241	293	185	71	46		6[illegible]	60	58	61	48							
	D	25	23	12	1	9		1	10	11	6	8							
Spain: Valencia	C													2		1		3	
	D																	1	
Tunisia	C		3						2	2	1	1			2	16			
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P			P	P	P	P					P	P	
Natal	C	1	3	P	P	P	P		P	P		P					P	P	
Orange Free State	C	P	P	P					P	P	P	P					P	P	
Transvaal	C				P	P	P												
Yugoslavia (see table below).																			

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
Chosen: Seoul	C		17		3		
Czechoslovakia	C	10	2	42	29	12	
Greece: Athens	C	12	6	3	1	3	
Latvia	C	18					3

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
Lithuania	C	2	70	62	73	27	16
	D		5	4	4		
Turkey	C	2	3	1	3	16	2
Yugoslavia	C	26	33	46	22	16	
	D	3	5	2	4	1	6

YELLOW FEVER

Brazil:	Cases
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2

	Cases
Gold Coast, July 10, 1930	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

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UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

BY THE UNITED STATES PUBLIC HEALTH SERVICE

VOLUME 45 :: :: NUMBER 34

AUGUST 22 - - - - 1930

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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PHYSICAL IMPAIRMENTS AND OCCUPATIONAL CLASS[1]

DIFFERENTIAL RATES BASED UPON MEDICAL EXAMINATIONS OF 100,924 NATIVE-BORN, ADULT WHITE INSURED MALES

By EDGAR SYDENSTRICKER, *Statistician, United States Public Health Service*, and *Director of Research, Milbank Memorial Fund*, and ROLLO H. BRITTEN, *Associate Statistician, United States Public Health Service*

Although the association of economic or social status and health has been given detailed consideration in the past, the studies have related primarily to records of sickness or of death. In fact, so far as known to the writers, no information is available in the literature as to whether a corresponding association would be found in the examinations of the physical condition of persons in various economic or broad occupational groups. In the belief that some light could be thrown upon this important question by the large mass of records of medical examinations of insured persons which has been accumulated by the Life Extension Institute in the past eight years, an analysis of over 100,000 of these records was attempted.

For a description of these records and a discussion of their limitations and value as medicostatistical data the reader is referred to the two preceding papers of this series (1) (2), especially the first paper. It is perhaps sufficient to point out here that the material included in this study was taken from the first (as differentiated from later) medical examinations of 100,924 native white[2] males made for policyholders in more than 40 life-insurance companies by more than 9,000 physicians. These examinations should not be confused with regular insurance medical examinations, made to determine whether a person is eligible for insurance; the records here used were those of health examinations made for policyholders as a part of the welfare service of the insurance companies. It should be pointed out also that the examinations naturally divide themselves into two kinds—

[1] Studies in the Diseases of Adult Life No. 4, from the Division of Research, Milbank Memorial Fund. This phase of the studies was carried out in cooperation with the Office of Industrial Hygiene, United States Public Health Service. The data were made available by the medical department of the Life Extension Institute.

[2] It is probable that a small number of foreign born were included, since the examination record in some instances failed to specify that the persons examined were native born.

those made in the "head" offices (chiefly in New York City and some in Chicago and Boston) and those made elsewhere (in the "field"). Since the former were conducted under more completely supervised conditions, it seemed best, in general, to keep the data for the two separate. Eighty per cent were classified as "field." An average rate was obtained for the combined data by taking the mean of the "head" and "field" rates, so as not to give excessive weight to the "field" data.

CLASSIFICATION INTO BROAD OCCUPATIONAL GROUPS

Differential impairment rates according to social or occupational class for this population of adult males are made possible by reason of the fact that on the health examination record of the Life Extension Institute an entry is made of the "occupation" of the person examined. These entries were not always made with precision or according to any standard occupational classification, but they are sufficiently definite to indicate the broad occupational or social group into which an individual could be classified. In fact, the statistical code used by the Institute contained 128 occupational designations, some of them quite definite and others of necessity somewhat indefinite. For the purpose of this paper a broad classification of these designations was made, as follows: (A) Agricultural; (B) professional; (C) executives, merchants, builders, etc; (D) salesmen; (E) clerks; (F) skilled trade; and (G) miscellaneous.

In some cases the classification of a specific occupation in these broad groups was quite difficult, but it will be seen from Table 1 that the number of persons in such occupations was relatively small. The table gives the classification of the specific occupations (as originally coded) into the broad groups, with the number of persons in each occupation and each group.

TABLE 1.—*Distribution of males according to occupation*

A. Agricultural workers		4,438
B. Professional		14,489
Accountants, auditors	2,703	
Engineers, civil	2,272	
Teachers	2,055	
Lawyers	1,515	
Clergymen, missionaries	1,224	
Dentists	827	
Architects	782	
Druggists	656	
Physicians, trained nurses	404	
Artists	358	
Authors	328	
Chemists	320	
Musicians	315	
Government officials	237	
Undertakers	192	
Optometrists	168	
Others	133	
C. Executives, merchants, builders, etc		15,755
Merchants and jobbers	8,184	
Contractors	2,066	
Manufacturers	1,796	
Brokers, bankers	1,432	
Officers of corporations	1,089	
Jewelers	668	
Hotel, restaurant keepers	430	
Others	90	
D. Salesmen		21,326
Salesmen	9,850	
Managers, plant, store	7,753	
Agents, etc	3,190	
Buyers	533	
E. Clerks		13,642
Bookkeepers, clerks	11,814	
Post office employees	1,358	
Cashiers, tellers	470	

TABLE 1.—*Distribution of males according to occupation*—Continued

F. Trade, skilled		16,714
Machinists	3,409	
Carpenters	1,985	
Tailors	1,577	
Printers	1,256	
Electricians	1,235	
Plumbers	998	
Chauffeurs	836	
Barbers	834	
Painters	829	
Butchers	712	
Cutters	507	
F. Trade, skilled—Continued.		
Woodworkers	462	
Metal workers	407	
Iron workers	390	
Bricklayers	304	
Domestic help	283	
Blacksmiths	203	
Tinsmiths	144	
Plasterers	108	
Others	235	
G. Miscellaneous		14,560
Total		100,924

DIFFERENCES IN THE AGE DISTRIBUTIONS OF THE OCCUPATIONAL CLASSES

Before considering the rates of impairment in the different occupational groups it is desirable to show how far the age distributions of the seven groups are comparable. In the next two tables, therefore, are presented the percentage distribution of the persons considered by age and the actual number in each age group.

TABLE 2.—*Percentage distribution according to age within broad occupational classes of males included in this study*

Age group	A	B	C	D	E	F
	Agricultural workers	Professional	Executives, merchants, builders, etc.	Managers (plant store), salesmen, etc.	Clerks	Skilled trade
AT HEAD OFFICE						
20-24		8.1	3.0	0.9	19.8	7.1
25-29		20.7	10.4	19.1	23.6	16.7
30-34		22.0	18.0	20.8	18.5	20.6
35-39		19.1	20.8	18.8	13.5	20.1
40-44		11.6	17.3	13.3	10.1	14.1
45-49		8.5	13.0	8.4	6.8	10.6
50-54		5.7	8.5	5.1	3.4	5.6
55-59		2.5	4.8	2.7	2.9	3.1
60-64		.7	2.3	1.3	1.0	1.4
65-69		.7	1.3	.6	.4	.5
70+		.4	.5	.1	.1	.3
IN THE FIELD						
20-24	5.7	5.0	3.1	5.1	15.2	6.7
25-29	10.3	15.6	9.3	14.2	22.1	15.0
30-34	17.0	20.8	15.6	19.1	20.1	19.9
35-39	17.9	19.1	19.3	20.0	15.1	22.1
40-44	15.2	14.9	17.1	15.8	11.0	14.9
45-49	12.8	10.2	13.7	11.2	7.2	9.6
50-54	9.0	7.3	9.9	7.3	4.7	5.8
55-59	5.9	3.8	6.3	4.1	2.5	3.2
60-64	3.3	1.8	3.5	2.1	1.4	1.8
65-69	1.9	1.0	1.7	.8	.6	.8
70+	.9	.4	.6	.4	.2	.3

TABLE 3.—*Number of males in each age group in broad occupational classes*

Age group	A	B	C	D	E	F
	Agricultural workers	Professional	Executives, merchants, builders, etc.	Managers (plant, store), salesmen, etc.	Clerks	Skilled trade
AT HEAD OFFICE						
20-24	1	104	73	347	387	187
25-29	6	420	249	673	461	437
30-34	9	445	432	732	362	541
35-39	10	387	500	660	263	527
40-44	10	234	416	466	197	370
45-49	13	172	313	297	133	278
50-54	7	116	205	178	67	148
55-59	4	51	116	96	57	80
60-64	6	15	56	44	19	36
65-69	0	14	31	20	7	12
70+	1	8	12	5	2	8
Total	67	2,026	2,403	3,518	1,955	2,621
IN THE FIELD						
20-24	248	621	397	964	1,777	958
25-29	451	1,948	1,188	2,673	2,584	2,163
30-34	746	2,594	1,992	3,584	2,353	2,849
35-39	782	2,380	2,460	3,754	1,768	3,164
40-44	667	1,852	2,187	2,973	1,282	2,142
45-49	562	1,275	1,751	2,096	844	1,377
50-54	392	907	1,262	1,371	547	826
55-59	260	476	800	766	294	456
60-64	144	222	452	394	164	260
65-69	85	124	213	145	65	116
70+	40	55	77	71	21	39
Total	4,377	12,454	12,779	18,791	11,699	14,340

The only striking differences in the age distributions are found in the three business groups (C, D, and E). Of the clerks, about 40 per cent were under 30 years of age, and of the executives only about 13 per cent. On the other hand, about 8 per cent of the clerks were 50 years of age and over, about 13 per cent of the managers and salesmen, and about 20 per cent of the executives. Therefore impairment rates for all ages could not be employed for these three groups without an adjustment for age. The point is of no great consequence, since a study of the impairment curves of the three groups by age showed so few differences that a combination of groups C, D, and E into a single "business" group has been considered feasible for the purpose of this paper. No other differences in the table are great enough to be distinctive in any comparison. It should be noted, however, that the farmer group has a somewhat greater proportion of persons in the older ages, where the prevalence of most impairments is highest.

COMPARISON OF IMPAIRMENT RATES FOR OCCUPATIONAL GROUPS

It is fully realized that no very precise meaning can be attached to a comparison of impairment rates in these various occupational groups for the reason that a clear-cut economic and social differentia-

tion is not possible from the data at hand. However, in the light of the interesting differences found in British mortality data (3) according to social class, even rough differential rates of impairment among broad occupational groups are worth consideration.

The impairment rates in the four occupational groups may be conveniently presented under a series of headings—eyes and ears, teeth, nose and throat, respiratory, heart and pulse, blood vessels, stomach and abdominal, genito-urinary, brain and nervous, miscellaneous, and urinalysis. Under each section will be given a table of rates for each impairment in the group without regard to age (with the omission of a few conditions on account of insufficient numbers), then a table and graph by age for the more important impairments showing apparently significant differences, and finally such discussion of the findings as seems pertinent. The results in all cases are kept distinct for the data obtained at the "head" office and for that obtained in the "field," but in the tables for all ages a column will be included for the total data. This will be, as stated above, the average of the rates of prevalence found at the "head" office and in the "field," except in the case of the agricultural group where, of course, there are rates only for the "field." Owing to small numbers, some combinations of age groups at the beginning and end of life will be necessary.

EYES AND EARS

In addition to corrected and uncorrected defect of vision (less than normal in either eye according to either Snellen or Jaeger tests), the only other item for which numbers justified any comparison by occupational group was diseases of the external eye or eyelid. The prevalence rates for these three items are given in Table 4.

TABLE 4.—*Frequency of certain impairments of the eyes in the four broad occupational groups*

Nature of impairment or disease and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Defective vision, corrected:					
Agricultural		21.4			938
Professional	34.9	39.2	37.0	707	4,888
Business	26.1	30.7	28.4	2,053	13,301
Skilled trade	18.1	19.5	18.8	475	2,798
Defective vision, uncorrected:					
Agricultural		15.1			659
Professional	28.2	17.3	22.7	571	2,154
Business	32.4	20.3	26.3	2,550	8,762
Skilled trade	39.6	23.8	31.7	1,040	3,408
Diseases of external eye or eyelids:					
Agricultural		.43			19
Professional	1.3	.56	.93	27	70
Business	1.3	.64	.97	101	277
Skilled trade	1.2	.77	.98	31	110

The relatively low rate in the farmer group for diseases of the external eye or eyelid, which are chiefly conjunctivitis and inflamed lids, is of interest. The differences in the case of defective vision are of sufficient importance to justify a comparison by age, which is made in Table 5 and Figure 1.

TABLE 5.—*Age prevalence of defective vision in the four broad occupational groups*

Corrected and uncorrected vision and occupational group	Age												
	In the field								At head office				
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	20-29	30-34	35-39	40-44	45+
	PER CENT												
Total:													
Agricultural	21.0	18.2	23.9	23.2	23.8	44.7	71.4	78.2	------	------	------	------	------
Professional	40.9	47.7	49.3	53.7	53.8	66.5	79.8	83.4	55.8	57.3	58.6	63.7	85.4
Business	36.4	38.9	42.1	44.1	48.9	64.4	78.7	83.2	47.3	49.1	55.8	62.2	81.7
Skilled trade	29.0	33.5	37.8	34.9	43.1	59.6	73.0	77.6	41.5	47.4	58.4	63.0	81.7
Defective vision, corrected:													
Agricultural	13.7	9.1	12.5	10.4	11.4	24.6	50.0	52.7	------	------	------	------	------
Professional	24.6	30.2	32.6	37.7	36.4	48.2	61.3	63.6	32.0	29.7	35.9	31.2	46.8
Business	19.2	20.6	22.8	24.7	28.8	40.9	55.1	59.8	19.8	21.4	21.2	27.0	39.7
Skilled trade	12.0	12.8	15.8	13.2	17.8	29.0	43.3	47.5	10.4	13.9	18.4	18.9	20.9
Defective vision, uncorrected:													
Agricultural	7.3	9.1	11.4	12.8	12.4	20.1	21.4	25.5	------	------	------	------	------
Professional	16.3	17.5	16.7	16.0	17.4	18.3	18.5	19.8	23.8	27.6	22.7	32.5	38.6
Business	17.2	18.3	19.3	19.4	20.1	23.5	23.6	23.4	27.5	27.7	31.6	35.2	42.0
Skilled trade	17.0	20.7	22.5	21.7	25.3	30.6	29.7	30.1	31.1	33.5	40.0	44.1	51.8
	NUMBER												
Defective vision, corrected:													
Agricultural	34	41	93	81	76	138	196	279	------	------	------	------	------
Professional	153	589	846	898	674	614	556	558	187	132	139	73	176
Business	604	1,327	1,808	1,478	1,853	1,919	1,751	2,070	433	327	344	291	632
Skilled trade	115	276	437	908	382	399	358	414	65	75	97	70	168
Defective vision, uncorrected:													
Agricultural	18	41	85	100	83	113	84	135	------	------	------	------	------
Professional	101	340	434	381	323	233	168	174	139	123	88	76	145
Business	539	1,181	1,533	1,509	1,203	1,103	752	800	602	422	450	380	666
Skilled trade	163	446	640	731	542	422	245	262	194	181	211	103	291

In Figure 1 the curves for all occupations (including the miscellaneous group) are also given, the rates having been published in the second paper in this series (2). The following comments seem justified:

(1) Of most importance is the low rate of defective vision among farmers. In the younger ages, while the other groups have percentages approximating 40, the farmer group shows only 22 or 23. After 50 years of age the differences are not so marked.

(2) No group shows the physiological change (2) around 45 or 50 years of age so clearly as the farmer group, the per cent affected rising from 23 for the age group 40–44 to 71 for the age group 50–54.

(3) In the data for both "head" and "field," the professional group shows the highest percentage of persons with defective vision. The excess, however, is slight after age 40.

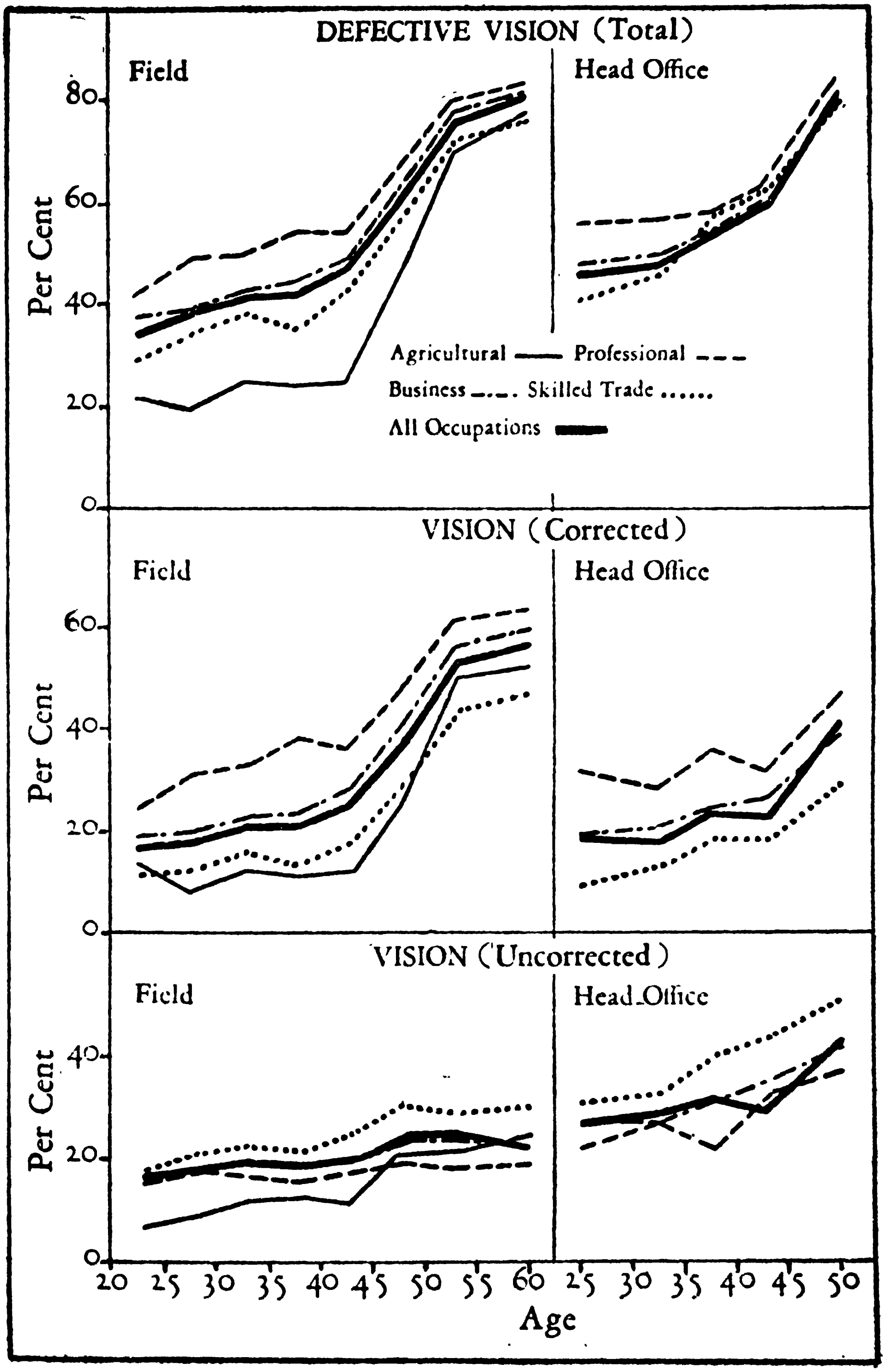
DEFECTIVE VISION (Total)
Field
Head Office
Per Cent
80
60
40
20
0
Agricultural
Professional
Business
Skilled Trade
All Occupations
VISION (Corrected)
Field
Head Office
Per Cent
60
40
20
0
VISION (Uncorrected)
Field
Head Office
Per Cent
40
20
0
20 25 30 35 40 45 50 55 60 25 30 35 40 45 50
Age

FIGURE 1

(4) The skilled trade group has a considerably lower than average rate for defective vision in the "field" data, but for the "head" office there is little difference.

(5) When we contrast the percentages for corrected and uncorrected vision, we find chiefly differences which would be expected. The professional group has a high rate for corrected and a low rate for uncorrected vision; the skilled trade has a low rate for corrected and a high rate for uncorrected. The farmer group, however, is low for both corrected and uncorrected vision.

(6) The business group presents a picture which is approximately the average for the entire population considered.

(7) The percentage of persons with uncorrected vision does not increase to any great degree with age. This is true of each occupational group.

(8) The age curve of defective vision in all occupational groups manifests the same general characteristics, i. e., a gradual rise up to 45 years, an abrupt increase during the next 10 years, and then a flattening of the curve, with a tendency to become asymptotic. The asymptotic tendency is suggested only by the "field" data, since the curves for the "head" office could not be carried to the older ages because of small numbers. It should be reiterated that the curves are based purely on the *percentage* with defective vision and do not take into account the *severity* of the defect.

Diseases and defects of the ears have been grouped together, and the rates of prevalence for all ages are given in Table 4. "Defective hearing" was taken as any condition less than 10/10 in either ear.[3] Audiometer tests were not used. Since the rates for defects and diseases of the ear and defective hearing are not mutually exclusive, it is quite probable that part of the defective hearing was due to wax in the ears, for which condition rates are given separately in the table.

TABLE 6.—*Frequency of certain impairments of the ears in the four broad occupational groups*

Nature of impairment or disease and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Defective hearing:					
Agricultural		12.3			537
Professional	12.8	10.0	11.4	260	1,241
Business	13.8	10.0	11.9	1,084	4,839
Skilled trade	17.8	12.7	15.2	467	1,816
Wax in ears:					
Agricultural		7.1			310
Professional	17.5	9.8	13.6	354	1,218
Business	16.9	9.7	13.3	1,333	4,194
Skilled trade	17.7	10.1	13.9	405	1,449

[3] A description as to how this test was conducted is given in the first paper in this series.

TABLE 6.—*Frequency of certain impairments of the ears in the four broad occupational groups*—Continued

Nature of impairment or disease and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Perforation of drum:					
Agricultural	----------	.37	----------	----------	16
Professional	1.1	.75	.92	23	94
Business	.94	.64	.79	74	278
Skilled trade	1.5	.66	1.1	39	95
Otitis media or discharging ears:					
Agricultural	----------	.98	----------	----------	43
Professional	.94	.83	.88	19	103
Business	.85	.87	.86	67	378
Skilled trade	.99	1.1	1.0	26	163

Relatively high rates for ear impairments in the skilled trade group are indicated by nearly all the rates in Table 6 as well as relatively

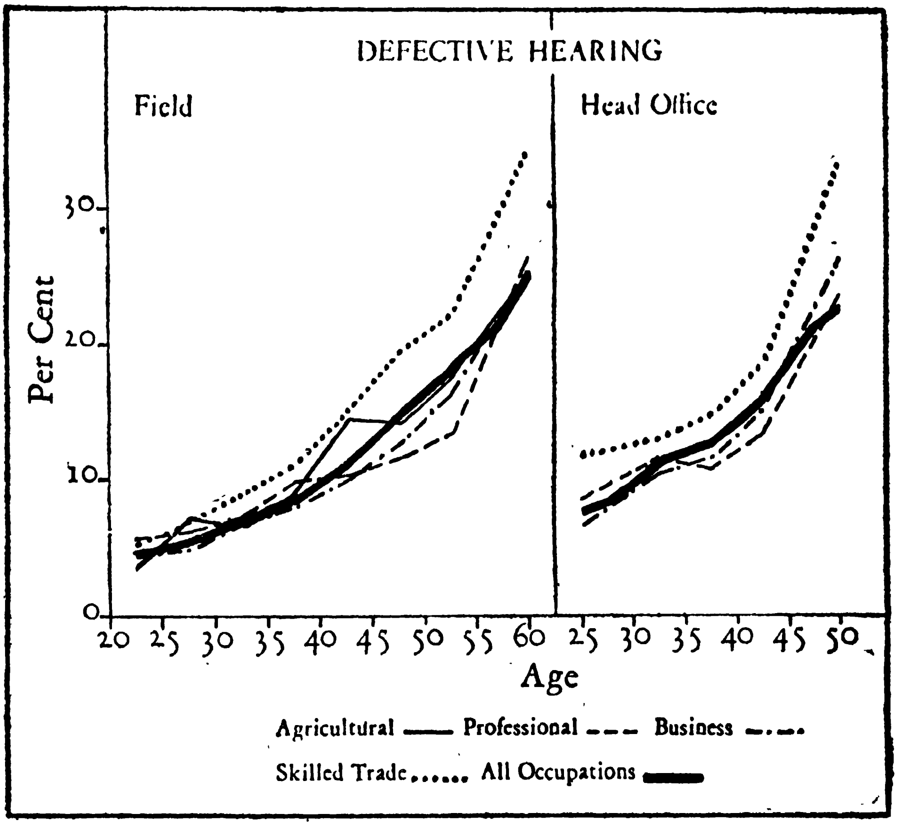

FIGURE 2

low rates for perforation of the drum and wax in ears among farmers. The rates according to age in the various groups are given in Table 7 and Figure 2.

TABLE 7.—*Age prevalence of defective hearing in the four occupational groups*

Occupational group	Age												
	In the field								At head office				
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	20-29	30-34	35-39	40-44	45+
	PERCENTAGE												
Agricultural	3.6	6.9	7.0	9.1	14.4	13.9	17.4	25.0	------	------	------	------	------
Professional	5.5	6.1	7.2	9.4	9.9	11.3	13.5	26.0	8.2	11.5	10.9	13.3	23.4
Business	5.0	5.3	7.0	8.2	10.0	12.6	16.7	25.2	7.0	10.7	11.1	15.1	26.9
Skilled trade	5.4	6.7	8.3	10.4	14.7	18.9	21.8	34.3	11.4	12.8	14.2	17.6	33.3
	NUMBER												
Agricultural	9	31	52	71	96	78	68	132	------	------	------	------	------
Professional	34	119	188	223	183	144	122	228	48	51	42	31	88
Business	156	339	552	680	641	590	531	872	154	163	158	163	428
Skilled trade	52	145	236	307	315	260	180	299	71	69	75	65	187

These rates are more suggestive and warrant, we believe, the following comments:

(1) The only occupational group showing a percentage for defective hearing widely different from that for the total data is the skilled trade. Here the difference is clear-cut in both "head" and "field," and suggests the advisability of an analysis by specific occupations in this group.

(2) There is a tendency for the professional group to have slightly lower rates than the average; but when all ear impairments are grouped together, the relatively low rate for the farmer group is not indicated.

(3) It was not deemed necessary to reproduce curves for wax in the ears, but it may be stated that the rate was considerably lower for the farmer group at different ages. No other marked differences were indicated.

(4) The physiological change dependent on age is evidently characteristic of all the groups.

TEETH

The picture shown by rates for defects of teeth (Table 8) is quite different from that showing impairments of eyes and ears in that dental caries and pyorrhea are considerably more prevalent among farmers than in any other "field" group. These conditions, as well as slightly infected gums and insufficient dentistry, are also relatively frequent in the skilled trade group. As would be expected, low rates are found in the professional group.

TABLE 8.—*Frequency of impairments of teeth in the four occupational groups*

Nature of impairment or disease and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Carious teeth, septic roots:					
Agricultural	----------	18.3	----------	----------	800
Professional	11.6	10.5	11.0	235	1,303
Business	14.6	12.3	13.4	1,147	5,323
Skilled trade	18.9	17.3	18.1	496	2,475
Slightly infected gums:					
Agricultural	----------	10.2	----------	----------	448
Professional	21.7	8.1	14.9	440	1,015
Business	24.5	10.5	17.5	1,936	4,533
Skilled trade	30.6	13.2	21.9	802	1,886
Pyorrhea, definite:					
Agricultural	----------	9.5	----------	----------	414
Professional	4.7	4.0	4.3	95	503
Business	5.3	5.0	5.1	416	2,152
Skilled trade	8.1	7.0	7.5	212	1,005
Missing teeth:					
Agricultural	----------	6.0	----------	----------	264
Professional	5.3	5.7	5.5	108	712
Business	6.9	6.1	6.5	547	2,652
Skilled trade	7.2	7.6	7.4	189	1,091
Presence of heavy dentistry (X ray recommended):					
Agricultural	----------	31.8	----------	----------	1,394
Professional	45.6	35.2	40.4	923	4,381
Business	45.7	34.5	40.1	3,601	14,939
Skilled trade	41.0	30.3	35.6	1,077	4,340

Pyorrhea (definite), carious teeth (septic roots), and slightly infected gums have been selected for comparison by age. The rates are presented in Table 9 and Figure 3.

TABLE 9.—*Age prevalence of certain impairments of the teeth in the four occupational groups*

Condition and occupational group	Age												
	In the field								At head office				
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	20-29	30-34	35-39	40-44	45+
	PERCENTAGE												
Slightly infected gums:													
Agricultural	5.2	4.0	7.6	8.8	11.7	13.0	17.4	13.6	------	------	------	------	------
Professional	2.9	5.1	6.4	8.9	9.8	10.6	11.5	11.2	19.2	18.9	20.7	29.9	25.0
Business	5.0	7.2	9.4	10.5	11.9	13.3	14.3	14.0	17.3	24.5	27.3	27.4	30.2
Skilled trade	6.3	8.4	12.1	12.4	16.8	18.0	17.4	18.0	20.5	26.4	35.7	36.8	36.9
Carious teeth, septic roots:													
Agricultural	14.1	15.8	16.5	16.0	18.3	19.8	22.7	23.8	------	------	------	------	------
Professional	7.6	8.3	10.8	10.0	11.2	10.9	13.5	12.4	9.6	13.5	12.4	12.8	10.9
Business	9.3	10.2	11.1	12.0	14.0	13.6	14.1	15.8	12.6	12.3	16.8	14.8	17.2
Skilled trade	12.1	14.0	16.5	15.4	19.9	21.6	22.2	22.2	13.1	15.7	18.8	25.4	24.2
Pyorrhea, definite:													
Agricultural	2.0	3.1	5.6	11.0	12.1	12.6	11.7	13.0	------	------	------	------	------
Professional	.8	1.5	2.4	4.5	5.5	6.3	5.5	7.8	1.2	4.0	5.9	6.4	8.5
Business	1.1	2.2	3.6	4.7	6.6	7.1	8.0	8.7	3.2	4.1	5.5	6.8	8.1
Skilled trade	2.0	3.5	5.5	6.7	8.6	11.5	12.5	10.9	5.3	6.3	8.9	8.4	11.9

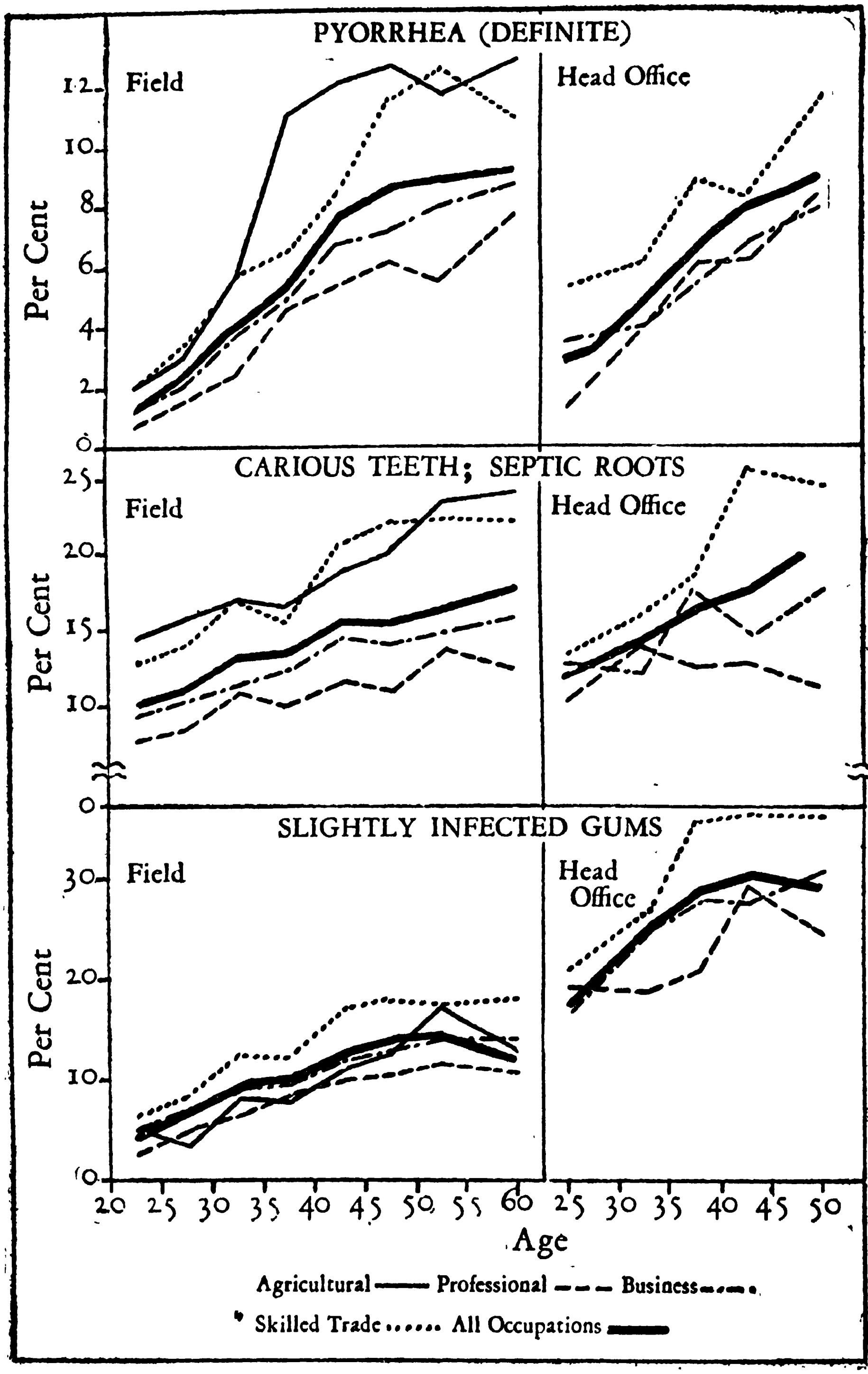
PYORRHEA (DEFINITE)
Field
Head Office
Per Cent
CARIOUS TEETH; SEPTIC ROOTS
Field
Head Office
Per Cent
SLIGHTLY INFECTED GUMS
Field
Head Office
Per Cent
Age
Agricultural Professional Business
Skilled Trade All Occupations

FIGURE 3

TABLE 9.—*Age prevalence of certain impairments of the teeth in the four occupational groups*—Continued

Condition and occupational group	Age												
	In the field								At head office				
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	50+	20-29	30-34	35-39	40-44	45+
	NUMBER												
Slightly infected gums:													
Agricultural	13	18	57	69	78	73	68	72	------	------	------	------	------
Professional	18	99	167	212	182	135	104	98	112	84	80	70	94
Business	156	462	748	846	767	622	454	485	378	374	388	296	480
Skilled trade	60	181	345	384	360	248	144	157	128	143	188	136	207
Carious teeth, septic roots:													
Agricultural	35	69	123	125	122	111	89	126	------	------	------	------	------
Professional	47	162	279	237	208	139	122	109	56	60	48	30	41
Business	292	656	881	1,011	804	640	447	546	276	187	239	160	277
Skilled trade	116	301	469	434	427	298	183	193	82	85	99	94	136
Pyorrhea, definite:													
Agricultural	5	14	42	86	81	71	46	69	------	------	------	------	------
Professional	5	30	62	106	102	80	50	68	7	18	23	15	32
Business	36	143	283	423	427	334	254	300	69	62	78	73	125
Skilled trade	19	76	158	163	184	159	103	95	33	34	47	31	67

The following comment is offered:

(1) Perhaps the most striking feature is the high rate of these impairments among farmers. The percentage with pyorrhea in this group rises rapidly with age and reaches 11 before the fortieth year, at a time of life when none of the other occupational groups have a higher percentage than 7 and the average is little more than 5. After that there is little increase. Carious teeth (septic roots) also show a high percentage for farmers. Since the rates for slightly infected gums were not above the average in the agricultural group, it is possible that the standard of classification by physicians was somewhat different on the average in the case of this occupational group.

(2) The high rates, in both "head" and "field," for skilled trades are probably to be expected. It will be observed that the curves for this occupational group are consistently high for pyorrhea, carious teeth (septic roots) and slightly infected gums—a definite indication of less care of the teeth in this group probably for economic reasons as well as because of poor hygienic habits.

(3) On the whole, the group with the lowest rates for all teeth conditions is the professional. The business group also has rates which are consistently below the average.

(4) The gradual rise with age is found in all of the occupational groups.

NOSE AND THROAT

The examiner was instructed to record all abnormalities and pathological conditions of the nose and throat, but the statistical codes included only conditions more severe than "slight" except where the word "septic" was used. For instance, in the case of enlarged, buried, or cryptic tonsils only conditions marked ++ or +++

regarded as sufficiently menacing to justify treatment or removal, were coded.

Nasopharyngitis (which included oropharyngitis) was regarded as chronic in coding impairments if there was a postnasal discharge; but the distinction between acute and chronic in this, as in other conditions, can not be taken as of much importance.

Allowing for chance variation, the impression from Table 10 can not be avoided that the most striking fact is the relatively low rates for the farmer group. They are the lowest of the four occupational classes for every condition in the table except nose and throat infection. Minor factors which may contribute to this difference are the slightly higher age distribution among farmers, since nose and throat defects decrease somewhat with age, and the possibility that the examinations of this group, largely rural, may have been somewhat less thorough than those of the other three groups. Although these factors may have some influence, there is still a strong presumption that a real difference exists.

TABLE 10.—*Frequency of certain impairments of the nose and throat in the four occupational groups*

Nature of impairment or disease and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Enlarged, cryptic, diseased, buried tonsils:					
Agricultural		20.3			888
Professional	62.4	26.5	44.4	1,264	3,303
Business	62.5	27.2	44.8	4,925	11,782
Skilled trade	63.9	27.3	45.6	1,677	3,916
Deflected septum, slight:					
Agricultural		17.5			765
Professional	59.6	24.6	42.1	1,208	3,069
Business	59.1	24.9	42.0	4,651	10,772
Skilled trade	58.8	24.2	41.5	1,543	3,474
Deflected septum, marked:					
Agricultural		2.4			104
Professional	12.0	3.2	7.6	243	397
Business	12.2	4.0	8.1	959	1,741
Skilled trade	12.8	3.9	8.3	337	566
Hypertrophic rhinitis (enlarged turbinates):					
Agricultural		13.9			609
Professional	54.8	20.4	37.6	1,110	2,538
Business	55.3	20.5	37.9	4,353	8,849
Skilled trade	57.2	20.4	38.8	1,501	2,931
Polypi, growths, ulcers:					
Agricultural		.89			39
Professional	1.4	1.3	1.3	28	157
Business	1.2	1.0	1.1	95	445
Skilled trade	2.3	1.2	1.7	60	175
Infection of nasal accessory sinus:					
Agricultural		.30			13
Professional	.94	.22	.58	19	28
Business	.46	.32	.39	36	139
Skilled trade	.57	.19	.38	15	27
Frequent colds:					
Agricultural		15.6			682
Professional	16.9	15.1	16.0	342	1,875
Business	16.7	14.8	15.7	1,315	6,392
Skilled trade	18.3	16.6	17.4	481	2,378
Nasopharyngitis, chronic:					
Agricultural		3.8			166
Professional	5.9	5.0	5.4	120	623
Business	6.6	4.6	5.6	520	1,988
Skilled trade	5.6	4.4	5.0	148	631
Nasopharyngitis, acute:					
Agricultural		2.0			89
Professional	2.9	3.9	3.2	48	490
Business	1.8	3.8	2.8	143	1,628
Skilled trade	2.3	4.2	3.2	60	600

Data by age are given for the most important conditions in Table 11 and Figure 4.

Table 11.—*Age prevalence of certain conditions of nose and throat in four occupational groups*

Nature of impairment and occupational group	Age												
	In the field								At head office				
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	20-29	30-34	35-39	40-44	45+
	Percentage												
Enlarged, cryptic, diseased, buried tonsils:													
Agricultural	29.0	22.4	24.3	21.5	20.8	16.7	15.6	13.6	-----	-----	-----	-----	-----
Professional	29.5	31.8	29.5	27.7	24.0	22.4	22.8	15.6	62.5	66.3	64.3	60.3	56.9
Business	31.1	32.2	30.6	29.2	25.3	22.7	20.6	18.3	62.6	64.9	65.5	63.2	57.4
Skilled trade	32.9	32.5	32.5	26.4	24.9	23.1	19.1	14.8	63.5	61.6	67.0	65.1	58.4
Hypertrophic rhinitis:													
Agricultural	10.9	14.2	17.8	16.0	11.7	14.1	11.5	11.0	-----	-----	-----	-----	-----
Professional	23.0	23.6	22.0	22.4	18.7	17.3	17.0	12.9	54.8	53.9	58.7	57.7	50.0
Business	22.3	23.4	21.9	20.7	19.5	18.5	17.8	16.4	55.8	58.8	54.8	58.4	52.5
Skilled trade	24.3	22.7	22.9	19.3	20.8	18.4	16.3	13.2	55.4	62.3	57.7	58.1	53.2
Nasopharyngitis (acute and chronic):													
Agricultural	6.0	5.4	6.7	5.9	5.7	5.5	5.3	5.7	-----	-----	-----	-----	-----
Professional	8.8	11.5	9.4	8.4	8.0	8.5	7.7	7.2	8.9	7.2	9.6	9.4	6.6
Business	8.9	9.5	9.0	8.8	8.0	7.4	7.1	6.5	8.5	9.3	8.6	8.7	7.2
Skilled trade	9.0	8.7	7.3	8.2	9.1	9.3	6.8	6.8	8.0	7.6	9.9	7.9	6.4
	Number												
Enlarged, cryptic, diseased, buried tonsils:													
Agricultural	72	101	181	168	139	94	61	72	-----	-----	-----	-----	-----
Professional	183	620	766	659	445	286	207	137	365	295	249	141	214
Business	975	2,076	2,423	2,067	1,627	1,064	656	633	1,370	990	932	682	910
Skilled trade	315	699	927	1,097	534	318	158	129	396	365	343	245	328
Hypertrophic rhinitis:													
Agricultural	27	64	133	125	78	79	45	58	-----	-----	-----	-----	-----
Professional	143	459	570	533	346	220	154	113	320	240	227	135	188
Business	700	1,505	1,739	1,483	1,253	870	505	567	1,221	898	780	584	831
Skilled trade	233	488	651	777	445	254	135	115	346	337	304	215	299
Nasopharyngitis (acute and chronic):													
Agricultural	15	24	50	46	38	31	21	30	-----	-----	-----	-----	-----
Professional	55	225	243	201	148	109	69	63	52	32	37	22	25
Business	280	610	713	622	515	349	226	224	186	142	122	94	108
Skilled trade	86	188	266	334	195	128	56	55	50	41	52	29	36

The following observations may be made:

(1) A definitely lower rate of enlarged, diseased, buried, or cryptic tonsils, hypertrophic rhinitis, and nasopharyngitis was found among farmers than among other occupational groups.

(2) The percentages of persons found to have these conditions were remarkably similar in the other three occupational groups.

(3) The gradual decline in prevalence as age advances is consistently found in all four occupational groups and for all of the nose and throat conditions appearing in the diagram.

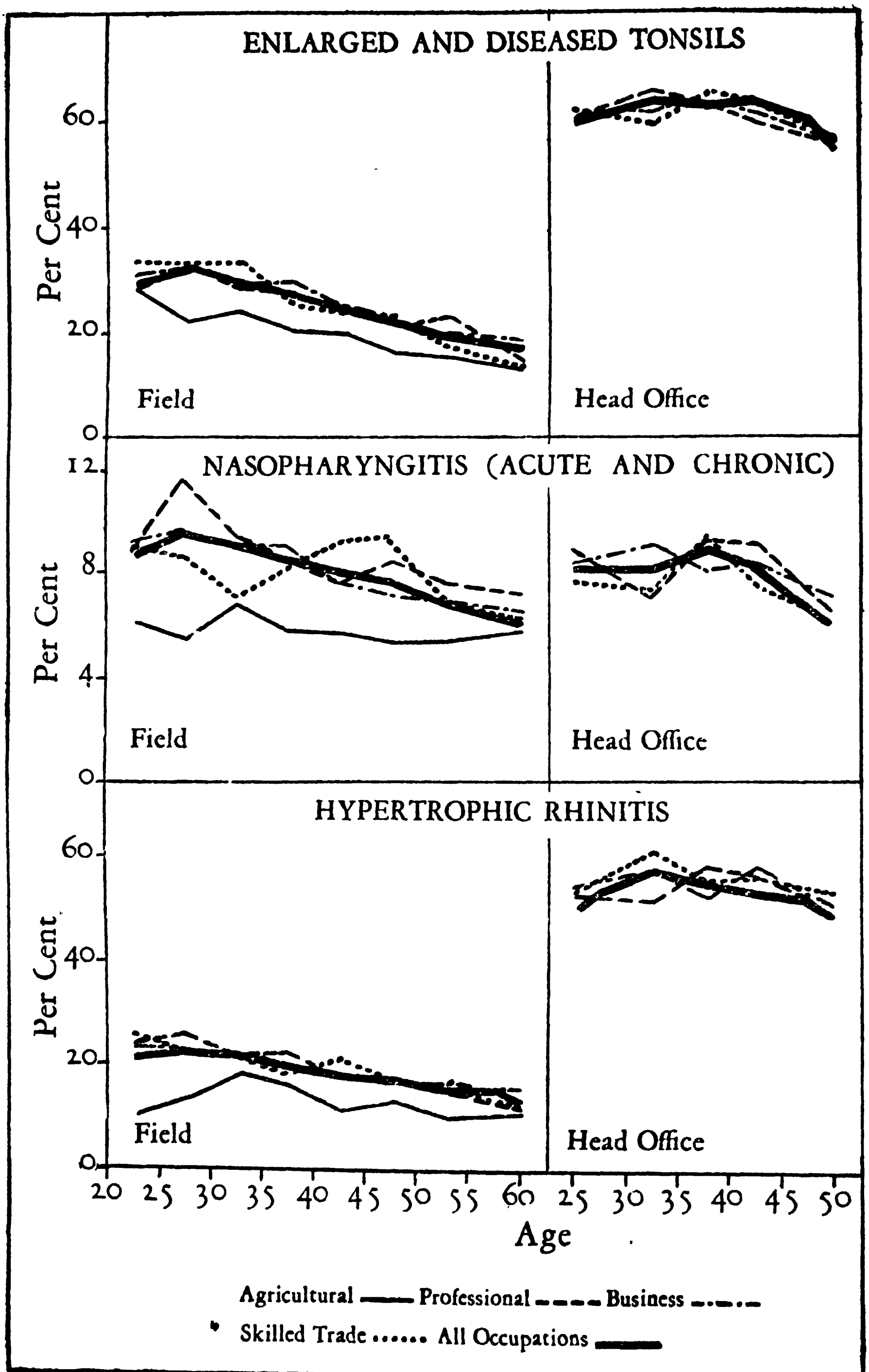
ENLARGED AND DISEASED TONSILS
Per Cent
60
40
20
0
Field
Head Office
NASOPHARYNGITIS (ACUTE AND CHRONIC)
12
8
4
0
HYPERTROPHIC RHINITIS
20 25 30 35 40 45 50 55 60 25 30 35 40 45 50
Age
Agricultural
Professional
Business
Skilled Trade
All Occupations

FIGURE 4

RESPIRATORY

For the group of respiratory conditions, the prevalence rates for chronic conditions found on physical examinations were too low to justify any consideration at different ages. Table 12 gives the rates for all ages. It is difficult to draw any conclusions from this table as to any significant differences, but the data are communicated for what they are worth. The occurrence of slightly higher rates for all conditions, except asthma, in the skilled trade group is possibly suggestive and is not inconsistent with other data.

TABLE 12.—*Frequency of certain respiratory impairments in the four occupational groups*

Nature of impairment or disease and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Abnormal signs in lungs, not suggestive of tuberculosis:					
Agricultural		2.9			129
Professional	4.1	4.0	4.0	83	492
Business	5.7	3.9	4.8	452	1,674
Skilled trade	5.9	4.5	5.2	154	648
Tuberculosis (including suspects):					
Agricultural		1.1			50
Professional	1.6	1.0	1.3	31	125
Business	1.4	1.1	1.3	112	475
Skilled trade	1.8	1.3	1.5	47	184
Emphysema:					
Agricultural		.46			20
Professional	.89	.44	.66	18	55
Business	.91	.38	.64	72	166
Skilled trade	1.3	.42	.86	33	60
Asthma:					
Agricultural		.69			30
Professional	.30	.49	.39	6	61
Business	.33	.32	.32	26	138
Skilled trade	.30	.40	.35	8	58

HEART AND PULSE

As was pointed out in our earlier papers, physical impairments were recorded by the examiner without giving a definite diagnosis. Thus a diagnosis of heart conditions, such as mitral regurgitation, is not recorded on the examination form. Instead, information is given as to the location and character of the murmur. A diagnosis for statistical purposes only was arrived at by the staff of the medical department in the Life Extension Institute in coding the records, definite instructions having been formulated as to the interpretation of the murmurs recorded. Table 13 gives the rates of prevalence, all ages, for the various heart and pulse conditions so recorded and interpreted.

TABLE 13.—*Frequency of impairments of heart and pulse in the four occupational groups*

Nature of impairment or disease and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Rapid pulse, over 90:					
Agricultural		2.7			119
Professional	11.9	5.5	8.7	242	685
Business	11.3	6.0	8.6	890	2,578
Skilled trade	12.0	5.4	8.7	314	776
Slow pulse, below 58:					
Agricultural		2.1			91
Professional	.44	1.1	.77	9	135
Business	.66	.84	.75	52	365
Skilled trade	.57	.70	.63	15	100
Intermittent pulse, extra systoles:					
Agricultural		.57			25
Professional	.79	.53	.66	16	66
Business	.76	.64	.70	60	277
Skilled trade	.57	.51	.54	15	73
Functional murmur or irregularity:					
Agricultural		4.0			173
Professional	7.6	5.4	6.5	153	669
Business	7.0	5.0	6.0	551	2,171
Skilled trade	7.3	4.9	6.1	191	705
Enlargement:					
Agricultural		2.9			129
Professional	1.6	2.5	2.0	83	312
Business	2.2	2.3	2.2	175	1,011
Skilled trade	2.7	2.7	2.7	72	387
Valvular lesions:					
Agricultural		2.1			95
Professional	2.4	2.5	2.5	48	320
Business	3.0	2.8	2.8	236	1,215
Skilled trade	2.9	3.0	3.0	78	429
Myocardial changes:					
Agricultural		.23			10
Professional	.44	.26	.35	9	33
Business	.58	.28	.43	46	123
Skilled trade	.84	.28	.56	22	40

Although a remarkable uniformity appears in the rates for the various broad occupational groups, it may be noted that the farmer group has lower rates for valvular diseases and functional murmurs than any other occupational class. It is also indicated that the farmer group has the highest percentage with pulse rates below 58 and the lowest percentage with pulse rates of 90 and more. Without further information any comment on the reasons for such marked differences is purely speculative. The rates for valvular lesions and enlarged heart according to age are given in Table 14 and Figure 5.

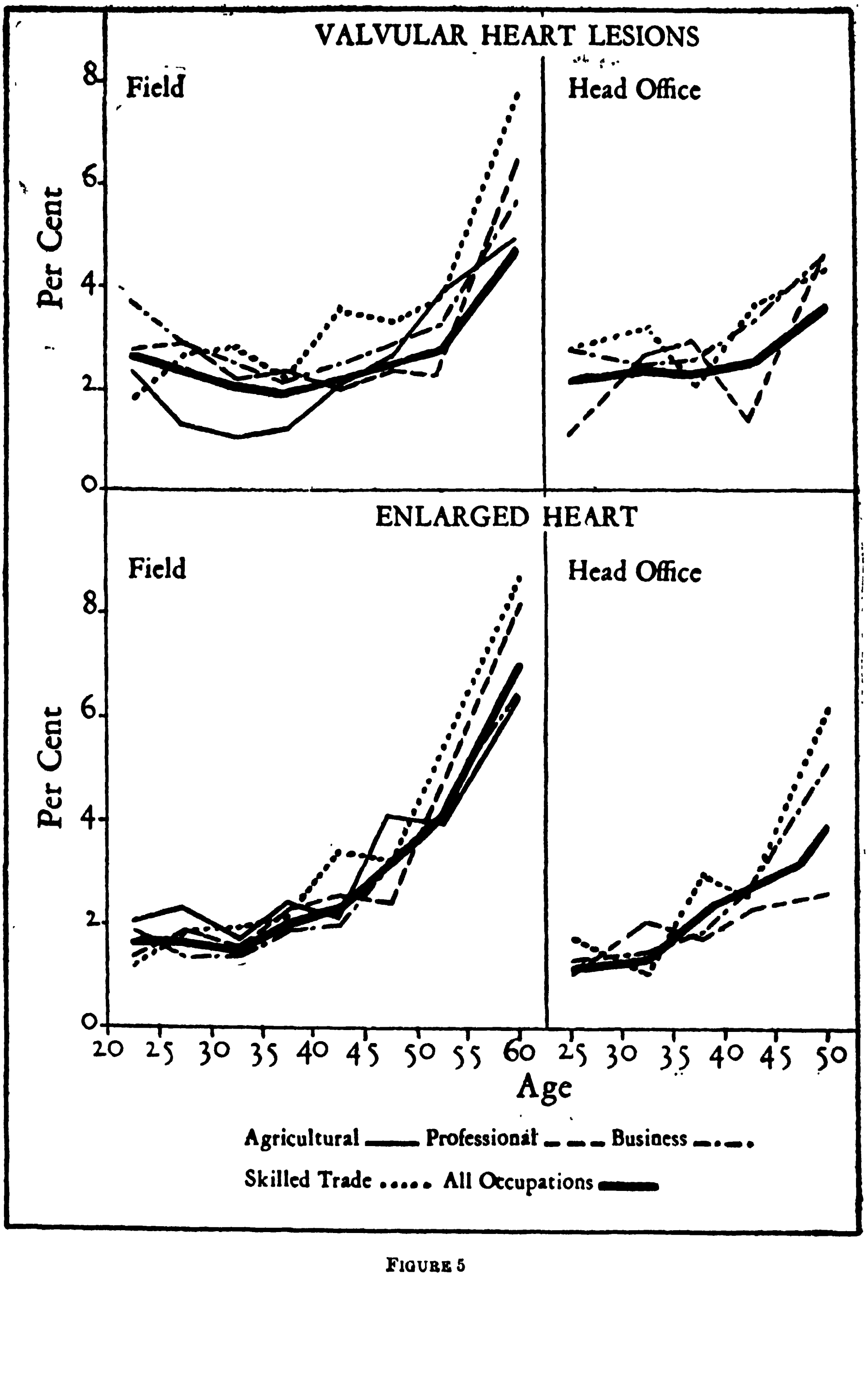
VALVULAR HEART LESIONS
Field
Head Office
ENLARGED HEART
Field
Head Office
Per Cent
0 2 4 6 8
20 25 30 35 40 45 50 55 60 25 30 35 40 45 50
Age
Agricultural
Professional
Business
Skilled Trade
All Occupations

FIGURE 5

TABLE 14.—*Age prevalence of valvular lesions and enlarged heart in the four occupational groups*

Nature of impairment and occupational group	Age												
	In the field								At head office				
	20-24	25-29	30-34	35-39	40-44	45-40	50-54	55+	20-29	30-34	35-39	40-44	45+
	PERCENTAGE												
Enlarged heart:													
Agricultural	2.0	2.2	1.6	2.3	2.1	3.9	3.8	6.2	------	------	------	------	------
Professional	1.3	1.7	1.5	2.2	2.3	2.3	4.4	7.8	0.9	1.8	1.6	2.1	2.4
Business	1.8	1.4	1.4	1.8	1.9	3.0	3.9	6.3	1.1	1.3	1.6	2.4	4.9
Skilled trade	1.2	1.7	1.7	2.0	3.3	3.1	5.2	8.4	1.6	.9	2.7	2.4	6.0
Valvular lesions:													
Agricultural	2.4	1.3	1.0	1.1	1.9	2.5	3.6	4.9	------	------	------	------	------
Professional	2.7	2.8	2.2	2.2	2.1	2.3	2.2	6.2	1.0	2.4	2.8	1.3	4.5
Business	3.8	2.8	2.5	2.1	2.3	2.7	3.1	5.5	2.6	2.3	2.5	3.1	4.5
Skilled trade	1.8	2.6	2.6	2.1	3.4	3.2	3.5	7.7	2.6	3.1	1.9	3.3	4.3
	NUMBER												
Enlarged heart:													
Agricultural	5	10	12	18	14	22	15	33	------	------	------	------	------
Professional	8	33	38	53	43	29	40	68	5	8	6	5	9
Business	56	93	114	138	121	141	124	218	24	20	23	26	78
Skilled trade	11	36	48	69	70	43	43	73	10	5	14	9	34
Valvular lesions:													
Agricultural	6	6	8	10	13	14	14	27	------	------	------	------	------
Professional	17	57	62	55	39	29	22	56	8	14	12	4	17
Business	123	187	202	174	151	127	98	182	62	38	41	34	79
Skilled trade	17	61	80	75	75	47	29	69	18	17	10	13	26

It may be noted that—

(1) Perhaps the most striking general fact brought out in the curves for heart conditions is the remarkable uniformity of the picture, regardless of the occupational group.

(2) Although one can not with assurance conclude that any occupational group has higher or lower rates for heart and pulse conditions, an interesting difference is indicated for the farmer group with respect to the character of the age curve for valvular heart lesions. During the early part of life the rate is relatively low, but later it rises to about the same level as that for other occupational groups. Does this suggest that the rates in the agricultural group more nearly represent the prevalence to be expected as a normal part of the aging process?

(3) In the case of valvular heart lesions, the decrease during the early part of life, as noted in the second paper of this series, is manifestly a characteristic of the group as a whole. In the "field" records the skilled labor group alone fails to show this tendency.[4]

(4) Enlarged heart appears to be found in about the same percentage of persons in all the occupational groups.

(5) The changes in prevalence at different ages of heart and pulse conditions, as shown for the entire population considered (2), is typical of all the broad occupational groups.

[4] In the "head" office, the age groups 20-24 and 25-29 were necessarily put together, naturally obliterating this tendency.

ARTERIAL THICKENING

Some interesting indications appear with respect to arterial thickening, but they may be considered more advantageously from the

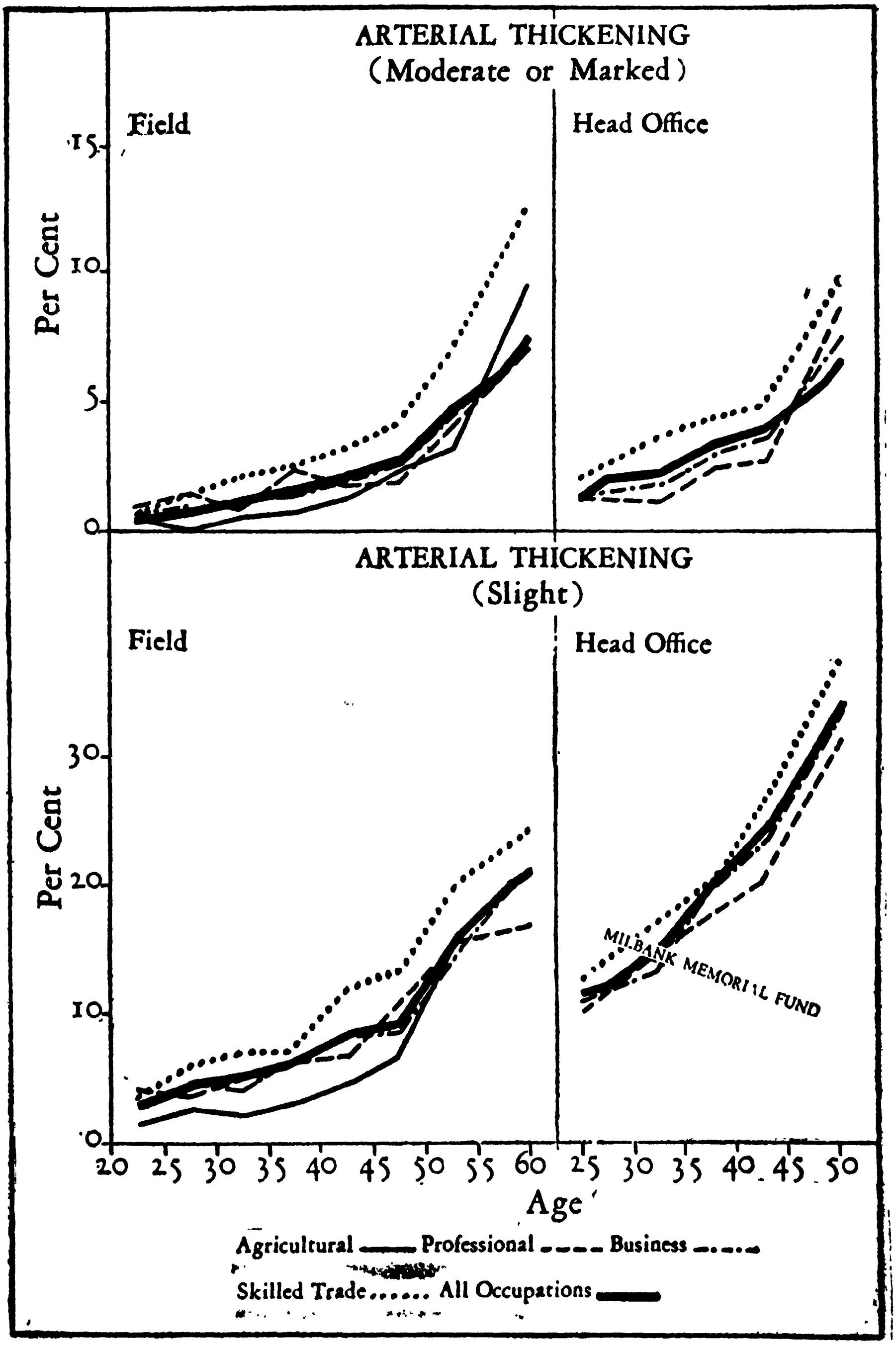

FIGURE 6

point of view of changes in age. Table 15 gives the rates for all ages, and Table 16 and Figure 6 give the data by age.

TABLE 15.—*Frequency of impairments of arterial thickening in the four occupational groups*

Nature of impairment and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Arterial thickening, slight:					
Agricultural	------	6.5	------	------	286
Professional	17.0	7.6	12.3	344	949
Business	19.2	7.9	13.5	1,512	3,397
Skilled trade	21.3	9.4	15.3	560	1,346
Arterial thickening, moderate:					
Agricultural	------	1.8	------	------	78
Professional	2.9	1.9	2.4	59	237
Business	3.0	1.9	2.4	240	839
Skilled trade	4.6	2.7	3.6	122	382
Arterial thickening, marked:					
Agricultural	------	.39	------	------	17
Professional	.15	.14	.14	3	17
Business	.23	.21	.22	18	91
Skilled trade	.15	.37	.26	4	53

TABLE 16.—*Age prevalence of arterial thickening in the four occupational groups*

Nature of impairment and occupational group	Age: In the field								Age: At head office				
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	20-29	30-34	35-39	40-44	45+
	PERCENTAGE												
Arterial thickening, slight:													
Agricultural	1.6	2.4	2.0	3.1	4.5	6.4	14.8	20.4	------	------	------	------	------
Professional	4.4	3.9	5.2	6.3	6.9	10.5	15.0	16.7	9.4	13.0	17.1	19.7	30.6
Business	3.7	4.7	4.8	6.6	7.9	8.8	14.0	20.3	10.5	13.2	18.8	23.5	33.5
Skilled trade	3.7	5.7	6.7	6.9	11.5	12.5	18.5	24.0	11.9	16.3	19.2	25.4	36.1
Arterial thickening, moderate or marked:													
Agricultural	.4	------	.6	.7	1.2	2.0	2.9	10.0	------	------	------	------	------
Professional	.8	1.2	.8	2.1	1.7	1.8	3.6	7.4	1.2	1.1	2.3	2.6	9.3
Business	.5	1.0	1.2	1.4	1.9	2.7	4.2	7.6	1.3	1.6	2.7	3.2	7.8
Skilled trade	.6	1.2	1.8	2.0	3.0	4.2	6.9	12.6	1.8	3.3	4.0	4.6	10.5
	NUMBER												
Arterial thickening, slight:													
Agricultural	4	11	15	24	30	36	58	108	------	------	------	------	------
Professional	27	75	134	149	127	134	136	167	55	62	66	46	115
Business	116	304	380	489	508	414	445	703	230	202	268	254	533
Skilled trade	35	123	190	255	247	172	153	209	74	88	101	94	203
Arterial thickening, moderate or marked:													
Agricultural	1	------	5	6	8	11	11	53	------	------	------	------	------
Professional	5	24	22	51	31	23	33	65	7	5	0	6	35
Business	17	63	94	112	123	127	134	264	20	24	38	35	128
Skilled trade	6	27	51	57	65	58	57	110	11	18	21	17	59

The following comments seem pertinent:

(1) A definitely higher rate is to be noted for the skilled trade group, in both "head" office and "field" data and for both moderate and slight arterial thickening, than for the other three occupational classes.

(2) Farmers, also a group performing hard physical work, on the other hand, seem to have a low rate during the earlier part of adult life; but by 50 years the curve blends with the average.

(3) More important than the differences, perhaps, is the fact that this degenerative change occurs in about the same proportion of persons in the different walks of life shown.

STOMACH AND ABDOMINAL ORGANS

A large group of conditions have been considered together in Table 17.

TABLE 17.—*Frequency of stomach and abdominal impairments in the four occupational groups*

Nature of impairment or disease and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Weak inguinal rings:					
Agricultural		2.1			94
Professional	10.8	3.9	7.3	218	489
Business	11.0	4.3	7.6	869	1,851
Skilled trade	10.9	4.8	7.8	287	690
Inguinal hernia, no truss:					
Agricultural		2.7			120
Professional	2.6	1.6	2.1	52	195
Business	3.4	1.9	2.6	268	838
Skilled trade	3.2	2.4	2.8	84	338
Inguinal hernia, truss:					
Agricultural		3.5			153
Professional	2.0	2.3	2.1	40	281
Business	2.6	2.4	2.5	205	1,048
Skilled trade	2.7	2.7	2.7	71	386
Other hernias:					
Agricultural		.66			29
Professional	.44	.65	.54	9	81
Business	.74	.79	.76	58	342
Skilled trade	.76	.87	.81	20	126
Tenderness in region of appendix:					
Agricultural		4.1			178
Professional	2.9	2.8	2.8	59	354
Business	2.0	3.0	2.5	158	1,301
Skilled trade	2.5	3.1	2.8	66	451
Constipation:					
Agricultural		27.2			1,190
Professional	33.0	32.9	32.9	668	4,092
Business	33.0	32.9	32.9	2,596	14,217
Skilled trade	37.7	34.5	36.1	988	4,945
Acid stomach:					
Agricultural		11.7			513
Professional	10.0	11.1	10.5	203	1,370
Business	10.4	10.4	10.4	817	4,509
Skilled trade	10.3	10.6	10.4	271	1,517
Gastric disturbances:					
Agricultural		8.9			388
Professional	8.5	8.0	8.2	173	1,000
Business	8.2	7.8	8.0	645	3,371
Skilled trade	9.3	7.7	8.5	243	1,100

The suggestive indications are (1) the relatively low rate of constipation in the agricultural group as contrasted with a relatively high rate in skilled trades; (2) the relatively frequent prevalence of tenderness in the region of the appendix in the agricultural group; (3) the relatively low prevalence of weak inguinal rings in the same group. Graphs by age have been prepared for constipation and hernia because of their great frequency. The data relating to tenderness over appendix hardly justify graphic presentation, but it may be stated that the agricultural group has a consistently high rate for this condition when comparison is made by age, especially for the first. Similarly, comparison by age showed that weak inguinal rings were found in a smaller percentage of farmers at nearly every age.

Table 18 and Figure 7 present the data for constipation and hernia.

TABLE 18.—*Age prevalence of constipation and hernia in the four occupational groups*

Nature of impairment and occupational group	Age												
	In the field								At head office				
	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+	20-29	30-34	35-39	40-44	45+
	PERCENTAGE												
Hernia:													
Agricultural	1.2	3.1	4.0	6.2	5.4	8.4	8.6	17.0	------	------	------	------	------
Professional	1.7	2.1	3.5	3.9	3.9	6.3	8.4	11.7	1.4	3.4	4.9	7.6	10.9
Business	1.6	2.3	2.8	4.0	6.0	7.5	8.8	13.3	2.6	4.8	6.1	8.5	15.4
Skilled trade	2.1	3.2	4.3	4.5	6.1	8.5	11.2	17.8	2.6	4.3	6.7	5.7	16.0
Constipation:													
Agricultural	19.0	20.6	25.6	27.2	28.2	29.2	31.1	32.5	------	------	------	------	------
Professional	28.8	30.3	32.6	32.5	35.0	35.9	34.4	32.5	30.7	31.5	36.7	34.2	33.8
Business	28.7	31.5	33.2	33.1	34.0	33.5	33.9	33.6	31.1	32.6	31.8	35.6	34.8
Skilled trade	28.5	36.4	33.5	32.5	38.0	36.2	33.4	36.7	29.3	44.0	38.7	40.8	37.7
	NUMBER												
Hernia:													
Agricultural	3	14	30	48	36	47	34	90	------	------	------	------	------
Professional	11	42	90	92	72	81	66	103	8	15	19	18	41
Business	50	151	222	319	388	354	281	461	57	73	87	92	214
Skilled trade	20	68	124	145	130	117	92	155	16	23	35	21	83
Constipation:													
Agricultural	47	93	191	213	188	164	122	172	------	------	------	------	------
Professional	179	591	845	774	648	458	312	285	179	140	142	80	127
Business	901	2,029	2,635	2,393	2,193	1,571	1,078	1,164	682	497	452	384	553
Skilled trade	273	783	954	1,280	814	498	276	320	183	238	204	151	212

The low rate of constipation among farmers, especially in the younger ages, perhaps may be ascribed to their active life, but this reason does not seem to account for the slightly higher than average rate in the skilled trade group. Whether diet or occupational conditions or other reasons are involved, it is of course impossible to say from the data at hand unless definite hazards characteristic of specific occupations are taken into account in a more detailed occupational analysis.

In regard to hernia, some rather interesting indications may be summarized, as follows:

(1) Greater differences in the rates for hernia than for other impairments in the intestinal region might have been anticipated in

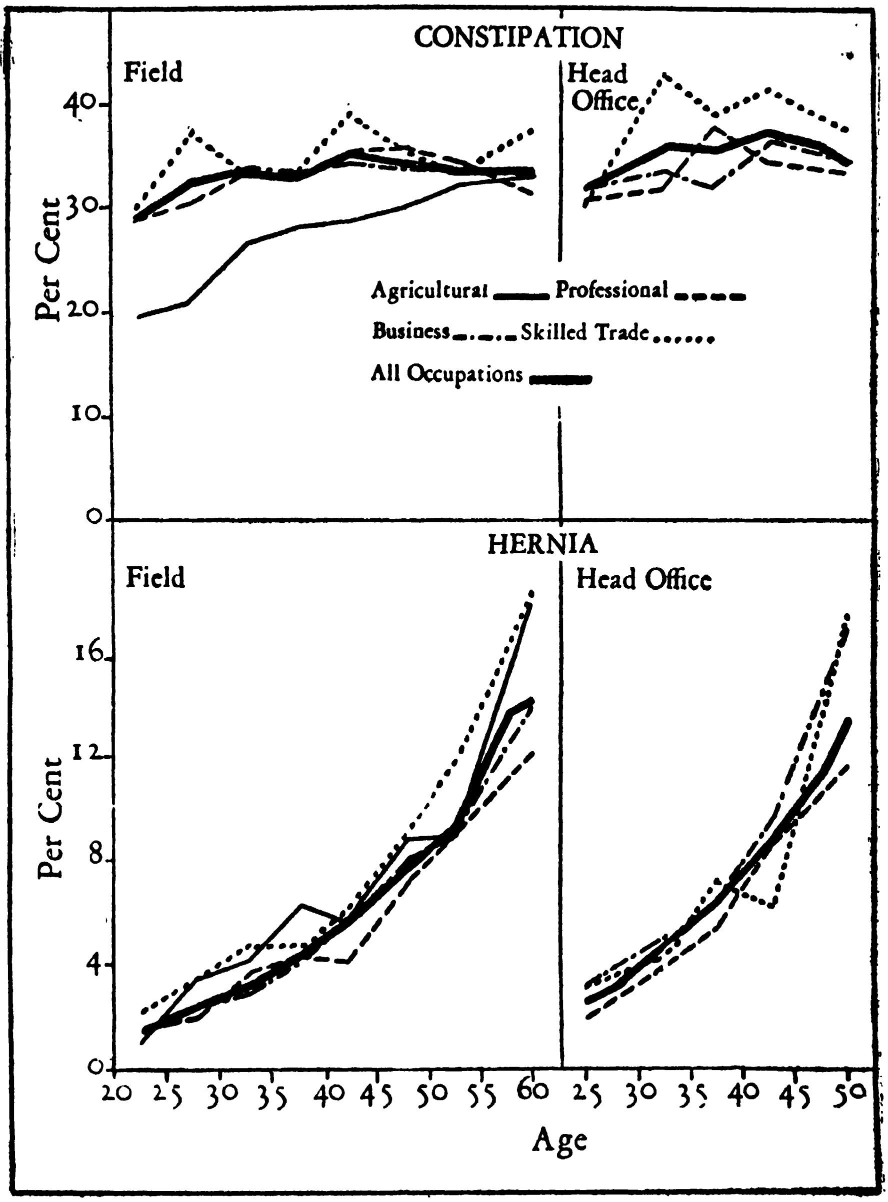

FIGURE 7

view of the fact that the farmer and the skilled trade groups include persons engaged in heavy labor. While these two groups do seem to have the highest rates, the differences are quite slight.

(2) The professional group has the lowest rates; but again the difference is of no great significance.

Thus, for hernia, the resemblances in the curves for different occupational groups are more striking than the differences. How far the population was a selected one can not be ascertained, of course, without knowing the age at which the individuals were insured and to what extent hernia caused exclusion from insurance. At any rate, it is suggested quite definitely by these curves that the increase in the hernia rate with age is associated with the physiological weakening which accompanies the aging process.

VARICOSE VEINS, VARICOCELE, HYDROCELE, HEMORRHOIDS

The prevalence rates for all ages are given in Table 19 for varicose veins, varicocele, hydrocele, and hemorrhoids. No clear differences in the four occupational groups are suggested.

TABLE 19.—*Frequency of varicose veins, etc., in the four occupational groups*

Nature of impairment or disease and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Varicose veins:					
Agricultural		4.1			181
Professional	5.1	3.4	4.2	104	421
Business	6.8	3.9	5.3	534	1,685
Skilled trade	7.4	4.5	5.9	193	641
Varicocele:					
Agricultural		6.0			262
Professional	9.7	8.9	9.3	197	1,105
Business	9.9	8.1	9.0	783	3,510
Skilled trade	9.6	8.3	8.9	252	1,193
Hydrocele:					
Agricultural		.69			30
Professional	.79	.53	.66	16	66
Business	.58	.54	.56	46	234
Skilled trade	.72	.50	.61	19	72
Hemorrhoids:					
Agricultural		10.9			478
Professional	15.0	12.5	13.7	303	1,554
Business	13.4	12.3	12.8	1,056	5,301
Skilled trade	11.9	11.2	11.5	313	1,608

GENITOURINARY IMPAIRMENTS

The only feature of interest in Table 20, giving the rates for enlarged prostate and frequent or painful urination, is the high rate for the latter in the agricultural group. Since 616 cases were recorded, this could hardly be regarded as a matter of chance, and the rate is consistently high for each age group. Obviously no definite statement can be made as to the cause of the difference.

TABLE 20.—*Frequency of genitourinary impairments in the four occupational groups*

Nature of impairment or disease and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Prostate enlarged, tender:					
Agricultural		6.6			289
Professional	8.8	5.3	7.0	178	656
Business	9.8	5.5	7.6	773	2,378
Skilled trade	8.6	4.6	6.6	226	659
Frequent or painful urination (nocturia):					
Agricultural		14.1			616
Professional	8.1	8.4	8.2	165	1,046
Business	7.9	8.5	8.2	619	3,659
Skilled trade	8.8	8.3	8.5	232	1,188

BRAIN AND NERVOUS SYSTEM

Rates for defects of the brain and nervous system are given in Table 21. There are no differences of great importance among the rates of the four groups.

TABLE 21.—*Frequency of brain and nervous impairments in the four occupational groups*

Nature of impairment or disease and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Sluggish, absent, unequal, or irregular reflexes:					
Agricultural		3.5			153
Professional	3.9	2.8	3.4	79	351
Business	4.2	3.1	3.6	332	1,327
Skilled trade	4.5	3.5	4.0	118	496
Exaggerated reflexes:					
Agricultural		1.8			80
Professional	4.2	2.7	3.4	85	338
Business	3.9	2.2	3.0	305	970
Skilled trade	4.2	2.2	3.2	109	315
Nervousness with increased reflexes:					
Agricultural		.57			25
Professional	1.8	1.1	1.4	37	136
Business	1.8	.84	1.3	139	365
Skilled trade	1.4	.61	1.0	38	88
Romberg, positive:					
Agricultural		.30			13
Professional	.54	.26	.40	11	33
Business	.53	.37	.45	42	158
Skilled trade	.80	.43	.61	21	61
Nervousness:					
Agricultural		4.5			199
Professional	8.4	7.6	8.0	170	943
Business	7.1	6.9	7.0	559	2,970
Skilled trade	7.6	6.5	7.0	199	929

MISCELLANEOUS IMPAIRMENTS

A group of impairments and histories of certain symptoms are given in Table 22. Although some points are of interest, such as the high rate for frequency of backache in the farmer and skilled trade groups, yet no items seemed to be of sufficient importance to warrant a consideration by age.

TABLE 22.—*Frequency of miscellaneous impairments in the four occupational groups*

Nature of impairment or disease and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Chronic skin affections:					
Agricultural		5.9			258
Professional	11.2	10.3	10.7	227	1,284
Business	10.6	9.6	10.1	834	4,169
Skilled trade	9.6	9.2	9.4	251	1,317
Adenitis (2 or more lymphatic nodes):					
Agricultural		1.9			81
Professional	2.4	2.8	2.6	49	350
Business	5.7	2.8	4.2	448	1,195
Skilled trade	3.1	4.0	3.6	82	567
Neuralgia, neuritis:					
Agricultural		1.2			54
Professional	.89	1.1	.99	18	133
Business	.63	.86	.74	50	371
Skilled trade	.57	.86	.71	15	124
Mastoids:					
Agricultural		.30			13
Professional	.49	.42	.46	10	52
Business	.44	.34	.39	35	149
Skilled trade	.23	.20	.21	6	28
Insomnia:					
Agricultural		1.1			48
Professional	1.0	1.1	1.0	21	143
Business	1.7	1.0	1.3	132	434
Skilled trade	2.4	1.4	1.9	62	197
Enlarged thyroid, simple goiter:					
Agricultural		1.8			80
Professional	.99	2.5	1.7	20	308
Business	.91	2.3	1.6	72	1,016
Skilled trade	.61	2.4	1.5	16	342
Dizziness:					
Agricultural		9.1			399
Professional	6.1	7.0	6.5	124	868
Business	6.4	6.8	6.6	507	2,942
Skilled trade	7.7	7.6	7.6	203	1,096
Backache:					
Agricultural		6.2			271
Professional	2.5	2.8	2.6	50	346
Business	3.7	3.6	3.6	292	1,562
Skilled trade	6.5	5.6	6.0	170	808
Headache:					
Agricultural		22.0			963
Professional	22.2	22.8	22.5	449	2,840
Business	22.1	21.1	21.6	1,743	9,132
Skilled trade	21.6	19.5	20.5	566	2,799
Use of patent medicine:					
Agricultural		7.3			319
Professional	7.7	9.3	8.5	157	1,164
Business	10.3	9.9	10.1	811	4,278
Skilled trade	9.4	10.1	9.7	246	1,447
Habitual use of laxatives:					
Agricultural		20.8			911
Professional	20.5	24.1	22.3	416	3,003
Business	24.6	26.0	25.3	1,938	11,232
Skilled trade	27.0	27.5	27.2	709	3,941

RESULTS OF URINALYSES

In general, the results of the routine urinalyses,[5] which are done for both "field" and "head" office in the Institute's laboratory, do not show marked differences in the four occupational groups. The data are recorded for persons of all ages by occupational groups in Table 23, without further comment, for such interpretation as may be given by the medical reader.

TABLE 23.—*Frequency of certain results of various urinalyses findings in the four occupational groups*

Nature of impairment or disease and occupational group	Per cent of persons examined			Number of persons showing specific impairments	
	At head office	In field	Average	At head office	In field
Albumin, slight trace:					
Agricultural		16.4			648
Professional	17.4	13.7	15.5	341	1,559
Business	19.3	14.5	16.9	1,469	5,753
Skilled trade	21.2	15.5	18.3	538	2,020
Albumin, definite trace:					
Agricultural		1.8			72
Professional	1.7	1.1	1.4	34	120
Business	2.1	1.5	1.8	163	585
Skilled trade	3.0	1.4	2.2	76	184
Albumin, marked amount:					
Agricultural		.43			17
Professional	.61	.40	.50	12	46
Business	1.2	.45	.82	88	178
Skilled trade	1.5	.57	1.0	37	74
Pus:					
Agricultural		8.7			344
Professional	12.6	9.2	10.9	247	1,055
Business	14.4	9.7	12.0	1,100	3,833
Skilled trade	15.6	9.9	12.7	396	1,293
Casts, hyaline:					
Agricultural		10.1			398
Professional	10.9	8.5	9.7	214	960
Business	12.7	9.2	10.9	968	3,636
Skilled trade	14.7	9.6	12.1	375	1,255
Casts, granular:					
Agricultural		6.0			239
Professional	8.0	5.0	6.5	156	565
Business	9.5	5.3	7.4	720	2,091
Skilled trade	11.2	5.7	8.4	285	747
Low specific gravity:					
Agricultural		1.8			72
Professional	5.7	3.4	4.5	112	383
Business	5.5	2.8	4.1	421	1,109
Skilled trade	3.7	2.1	2.9	94	273
Sugar, trace:					
Agricultural		5.7			224
Professional	5.5	5.4	5.4	108	619
Business	5.5	5.3	5.4	416	2,121
Skilled trade	6.3	5.2	5.7	160	682
Sugar, marked amount (1 per cent or more):					
Agricultural		.20			8
Professional	.36	.37	.36	7	42
Business	.59	.43	.51	45	170
Skilled trade	.55	.44	.49	14	57
Blood:					
Agricultural		.18			7
Professional	.25	.19	.22	5	22
Business	.22	.22	.22	17	86
Skilled trade	.35	.20	.27	9	26

[5] Some individuals were not given the test, but the population has been corrected for this difference.

COMPARISON OF RATES OF CERTAIN IMPAIRMENTS FOR OCCUPATIONS WITHIN THE "BUSINESS" GROUP

A combination of executives, merchants, etc., of salesmen, etc., and of clerks into a "business" group was made because no essential differences were found in the impairment rates among these three subgroups. Table 24 is presented to bring out this general fact. It is limited to the more important impairments. Since marked differences exist in the age distributions of these three occupational groups (see p. 1329), no attempt is made to give rates except for specific ages. To save space, the rates for the "field" examinations alone are given. No careful examination of this table is necessary to reveal the fact that in these three occupational groups the rates of prevalence of impairments are closely parallel, except in a few instances of doubtful statistical significance.

TABLE 24.—*Age prevalence of certain impairments in the three subdivisions of the business group ("field")*

Nature of impairment and subdivision of business group	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+
	PER CENT							
Defective vision, total:								
C. Executives, merchants, etc	39.3	38.8	40.4	43.5	48.4	64.5	78.1	65.8
D. Salesmen, etc	36.7	37.1	41.5	43.7	48.9	63.1	80.0	83.4
E. Clerks	35.6	40.9	44.6	46.0	49.5	67.4	77.1	82.3
Defective hearing:								
C. Executives, merchants, etc	3.8	5.6	7.0	8.0	9.4	12.1	16.5	25.7
D. Salesmen, etc	5.5	5.6	6.9	8.2	10.4	12.9	16.1	24.9
E. Clerks	5.0	4.7	7.0	8.7	9.9	12.8	18.7	24.3
Enlarged, cryptic, diseased, buried tonsils:								
C. Executives, merchants, etc	31.7	33.8	32.1	29.7	25.1	23.3	21.2	16.5
D. Salesmen, etc	33.9	33.2	30.9	29.2	25.8	23.1	20.1	21.3
E. Clerks	29.4	30.4	28.8	28.3	24.3	20.4	20.1	15.8
Nasopharyngitis:								
C. Executives, merchants, etc	8.8	8.9	9.1	8.0	7.8	7.2	7.0	6.3
D. Salesmen, etc	10.1	9.6	8.9	8.9	8.4	7.3	6.3	6.0
E. Clerks	8.3	9.6	9.1	9.5	7.4	8.3	9.3	8.1
Slightly infected gums:								
C. Executives, merchants, etc	4.5	8.4	10.6	11.8	13.2	13.6	15.1	13.2
D. Salesmen, etc	5.9	7.2	9.2	10.2	11.5	12.8	13.6	14.5
E. Clerks	4.6	6.5	8.8	9.3	10.5	13.6	14.1	15.3
Carious teeth, septic roots:								
C. Executives, merchants, etc	10.1	10.0	10.8	12.6	14.8	13.5	12.0	14.3
D. Salesmen, etc	9.3	10.5	11.0	11.6	13.4	13.1	15.2	16.0
E. Clerks	9.1	9.9	11.6	12.1	14.4	15.3	15.9	19.3
Pyorrhea, definite:								
C. Executives, merchants, etc	.8	3.0	4.5	4.8	6.9	7.6	7.8	8.5
D. Salesmen, etc	1.2	2.0	3.2	4.3	6.3	6.9	8.8	8.7
E. Clerks	1.2	2.1	3.4	3.3	6.9	6.8	6.6	9.0
Enlarged heart:								
C. Executives, merchants, etc	1.5	1.3	1.1	2.0	1.7	2.7	2.9	5.8
D. Salesmen, etc	1.8	1.3	1.4	1.8	1.8	2.7	4.2	5.8
E. Clerks	1.9	1.6	1.8	1.5	2.4	4.4	5.3	9.0
Valvular lesions:								
C. Executives, merchants, etc	3.4	2.4	2.0	2.1	1.4	2.3	2.8	4.9
D. Salesmen, etc	2.8	2.3	2.2	1.9	2.6	2.7	3.4	5.7
E. Clerks	4.3	3.6	3.3	2.6	2.9	3.0	3.2	5.9
Arterial thickening, moderate or marked:								
C. Executives, merchants, etc	.8	1.5	1.3	1.1	1.4	2.7	3.7	6.8
D. Salesmen, etc	.6	.8	1.2	1.5	1.9	2.5	3.6	7.8
E. Clerks	.5	.9	1.1	1.3	2.7	3.3	6.9	9.6
Arterial thickening, slight:								
C. Executives, merchants, etc	3.3	6.2	4.7	6.8	8.6	9.7	13.9	20.2
D. Salesmen, etc	4.6	4.5	5.1	6.8	7.5	8.0	13.2	19.8
E. Clerks	3.3	4.2	4.3	5.9	7.7	9.2	16.3	21.9
Hernia:								
C. Executives, merchants, etc	1.3	2.2	3.2	4.3	5.7	7.1	9.1	12.3
D. Salesmen, etc	1.8	2.4	2.9	3.9	6.1	7.6	8.8	14.7
E. Clerks	1.5	2.5	2.4	4.0	6.2	8.2	8.2	12.7

TABLE 24.—*Age prevalence of certain impairments in the three subdivisions of the business group ("field")*—Continued

Nature of impairment and subdivision of business group	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55+
	PER CENT							
Constipation:								
C. Executives, merchants, etc	29.0	29.7	32.6	31.0	33.7	32.6	33.0	31.8
D. Salesmen, etc	20.2	30.9	31.8	34.1	33.4	33.1	34.8	33.9
E. Clerks	28.4	32.9	35.9	34.2	36.2	35.8	33.6	38.2
	NUMBER							
Defective vision, total:								
C. Executives, merchants, etc	156	461	805	813	1,058	1,130	985	1,014
D. Salesmen, etc	353	990	1,488	1,105	1,454	1,323	1,096	1,147
E. Clerks	634	1,057	1,048	1,069	634	569	422	448
Defective hearing:								
C. Executives, merchants, etc	15	67	139	154	205	211	208	397
D. Salesmen, etc	53	150	248	329	309	271	221	343
E. Clerks	88	122	165	197	127	108	102	132
Enlarged, cryptic, diseased, buried tonsils:								
C. Executives, merchants, etc	126	402	639	500	548	408	267	254
D. Salesmen, etc	327	888	1,107	836	768	484	276	293
E. Clerks	522	786	677	731	311	172	113	86
Nasopharyngitis:								
C. Executives, merchants, etc	35	106	181	167	171	126	89	97
D. Salesmen, etc	97	255	318	257	249	153	86	83
E. Clerks	148	249	214	198	95	70	51	44
Slightly infected gums:								
C. Executives, merchants, etc	18	100	212	165	289	239	191	203
D. Salesmen, etc	57	193	330	391	343	268	186	199
E. Clerks	81	169	206	290	135	115	77	83
Carious teeth, septic roots:								
C. Executives, merchants, etc	40	119	216	214	323	237	151	221
D. Salesmen, etc	90	281	393	488	397	274	209	220
E. Clerks	162	256	272	309	184	129	87	105
Pyorrhea, definite:								
C. Executives, merchants, etc	3	36	89	94	151	133	98	131
D. Salesmen, etc	12	53	114	211	187	144	120	120
E. Clerks	21	54	80	118	89	57	36	49
Enlarged heart:								
C. Executives, merchants, etc	6	16	21	27	37	48	37	89
D. Salesmen, etc	17	36	51	63	53	56	58	80
E. Clerks	33	41	42	48	31	37	29	49
Valvular lesions:								
C. Executives, merchants, etc	13	29	42	48	33	41	34	76
D. Salesmen, etc	29	63	82	70	79	60	47	78
E. Clerks	81	95	78	56	39	26	17	32
Arterial thickening, moderate or marked:								
C. Executives, merchants, etc	3	18	25	23	31	46	47	105
D. Salesmen, etc	6	22	43	61	57	53	49	107
E. Clerks	8	23	26	28	35	28	38	52
Arterial thickening, slight:								
C. Executives, merchants, etc	13	74	94	104	187	169	175	311
D. Salesmen, etc	44	121	184	217	222	167	181	273
E. Clerks	59	109	102	168	99	78	89	119
Hernia:								
C. Executives, merchants, etc	5	25	62	71	125	125	116	190
D. Salesmen, etc	18	64	105	143	183	160	120	202
E. Clerks	27	62	55	105	80	69	45	69
Constipation:								
C. Executives, merchants, etc	115	353	649	604	737	570	417	490
D. Salesmen, etc	281	825	1,141	1,027	992	699	477	466
E. Clerks	505	851	845	762	464	302	184	208

COMPARISON WITH MORTALITY DATA

Space does not permit an adequate comparison here with mortality and morbidity data. The data heretofore available have been carefully summarized by Collins (3) in a recent publication on the relation of economic status and health. Special reference, however, may be made to the Registrar General's (England and Wales) Occupational Supplement for 1921–1923 (4) (5) which gives differential death rates from important causes according to social

groups. In Table 25 the English comparative mortality figures [6] are shown for four groups which are roughly comparable to the four used in the present study, namely, farmers; upper and middle (corresponding roughly to professional); intermediate; and skilled trade. The business group is no doubt made up of persons from both upper and middle and intermediate groups. Only the important causes of death are included.

TABLE 25.—*Standardized mortality (comparative mortality figures) of males 20–65 years of age in England and Wales, 1921–1923: Farmers, upper and middle, intermediate, and skilled trade, by cause*

Cause of death	Farmers	Upper and middle (Social Class I)	Intermediate (Social Class II)	Skilled trade (Social Class III)
All causes	674	812	942	951
Influenza	734	835	937	934
Tuberculosis (all forms)	462	508	855	978
Respiratory tuberculosis	414	489	844	977
Syphilis, aneurysm, general paralysis of insane, etc	262	727	911	963
Cancer (all sites)	724	798	920	990
Diabetes	1,311	1,246	1,451	918
Cerebral hemorrhage, etc	717	884	1,029	996
Diseases of circulatory system	666	930	1,012	930
Diseases of the heart	684	820	998	931
Valvular diseases of heart	705	569	902	964
Other heart diseases	663	1,062	1,091	899
Diseases of respiratory system	486	634	759	918
Bronchitis	230	256	548	937
Pneumonia	592	828	841	895
Diseases of digestive system	985	1,274	1,225	884
Peptic ulcer	880	905	968	968
Appendicitis	1,629	1,697	1,427	888
Cirrhosis of liver	781	1,625	1,865	656
Chronic nephritis	722	994	1,128	968
Suicide	1,235	1,156	1,276	905
Accident	751	809	700	949

(Registrar General's Decennial Supplement, England and Wales, 1921, Part II. Occupational mortality, fertility, and infant mortality, p. cxxiii.)

Since Table 25 does not give data for the lower social classes, for which no comparable information is available from the physical examinations, the contrast in the impairment rates according to social class appears much less than that shown by mortality data for a larger range of social classes in England. But, even if we had impairment rates and mortality rates resulting from these impairments for strictly comparable social groups, it is reasonable to expect that, on the whole, differential death rates would exhibit wider variations according to social class than differential impairment rates. This, for the reason that the wealthier and more intelligent class would take greater advantage of medical and other facilities for correcting or mitigating the effects of impairments after they manifest themselves in sickness or by other definite symptoms.

It is obvious, of course, that no specific comparisons of the English report and our study can be made. The general indications undoubtedly are similar. It may be noted that the relatively low rate among

[6] That is, the standardized rates by social class are obtained for each disease for the ages 20–65 and divided by the corresponding rate for all occupied and retired.

farmers for respiratory impairments (which are all of the upper respiratory tract) is consistent with the English mortality from diseases of the respiratory system in the farmer group. Although the impairment rates for heart diseases are not widely different in the broad occupational groups, the farmers show the lowest rate and the skilled trade group the highest. In the mortality data it will be found that the farmers also have the lowest rates, and the intermediate and skilled trade groups are highest. The same tendencies are found in the rates of hardening of the arteries in the Life Extension data. The comparative mortality figures were not given in the British volume for this disease alone, but examination of the rates by age showed that the mortality among farmers was relatively low for this condition. The professional group, however, did not have as low mortality rates as the intermediate and skilled trade classes.

No other disease groups, for which the rates are not approximately the same for each occupational group, seem sufficiently comparable to be discussed.

SUMMARY

By way of summary, it seems desirable to present a bird's-eye view of what has been given in detail in the tables and graphs. This has been attempted in a final table in purely qualitative terms. The impairments whose rates differ rather widely among the broad occupational groups are listed on a chart in which each group heads two columns, one marked "high," for the impairments in which that group has rates above average, and one marked "low," for the impairments in which that group has rates below average.

Only the outstanding differences are considered, since it would be confusing to include instances which are barely significant statistically or where the differences are of no practical importance. The "head" office and "field" data are not considered separately, but the consistency of the results in the two divisions has been taken into account.

Although actual rates or differences have not been shown, (M) has been used to indicate that the difference is marked, (S) that it is slight, and a question mark (?) that the authors could not be sure that the difference was statistically significant, but felt that the condition was of sufficient interest to be mentioned.

It is possible from this table to see rather clearly what the broad differences are. For most conditions, the agricultural group would seem to have rates definitely below the average for all examined, but there are important exceptions, notably for teeth, stomach and abdominal conditions, and the genitourinary system. The rates are low for diseases of the eye and ear, nose and throat, heart and pulse, blood vessels, and many miscellaneous conditions.

Table 27.—*Summary of rates of impairment in broad occupational groups as to whether higher or lower than average*

[S=slight difference; M=marked difference; (?) indicates that it is doubtful whether difference is significant]

	Agricultural		Professional		Business		Skilled trade	
	High	Low	High	Low	High	Low	High	Low
Eye and ear.		Defective vision—Corrected (M). Uncorrected. Diseases of external eye (?). Perforation of ear-drum (?). Wax in ears.	Defective vision—Corrected.	Defective vision—Uncorrected. Defective hearing (S).			Defective vision—Uncorrected (M). Defective hearing (M) (ranks highest in most of group).	Defective vision—Corrected.
Teeth.	Carious, septic (M). Pyorrhea, definite (M).			Carious, septic (M). Slightly infected gums. Pyorrhea, definite (M). Insufficient dentistry (S).		Carious (S). Pyorrhea, definite (S).	Carious, septic (M). Slightly infected gums. Pyorrhea, definite. Insufficient dentistry.	
Nose and throat.		Deflected septum. Enlarged and diseased tonsils (M). Nasopharyngitis (M). Hypertrophic rhinitis (M).					Frequent colds (S).	
Respiratory.	Asthma (?).					(Tendency to rank lowest in this group.)	Bronchitis.	
Heart and pulse.	Slow pulse, per cent with.	Functional murmur. Valvular (S). Rapid pulse, per cent with.					Valvular (S). Enlarged (S).	
Arterial thickening.		Arterial thickening (S).		Arterial thickening (S).			Arterial thickening (M).	

Stomach and abdominal.	Gastric disorders. Tenderness gall bladder region (M). Tenderness appendix region. Hernia (S).	Constipation (M). Weak inguinal rings. Hemorrhoids (S). Habitual use of laxatives.		Hernia (S).			Constipation. Habitual use of laxatives (S).	
Genitourinary.	Enlarged prostate. Frequent urination (M).			(Tendency to rank lowest in this group.)				
Brain and nervous.	Neurasthenia.	Nervousness. Exaggerated reflexes.	Nervousness.					
Miscellaneous.	Dizziness. Backache.	Adenitis. Chronic skin. Use of patent medicines. Enlarged thyroid. Varicocele.	Chronic skin. Mastoids.	Backache.			Backache. Insomnia. Use of patent medicines. Varicose veins.	Mastoids (?).
Urinalyses.	Albumin.	Low specific gravity, per cent with (tendency for sugar, pus, blood to be low).	Low specific gravity, per cent with.	(Tendency for sugar, pus, blood, casts to be low.)			Albumin (tendency for sugar, pus, blood, casts to be high).	

The professional group conforms more nearly to the average for the entire population considered. Few conditions are found to have excessive rates; but on the other hand, there are not very many with particularly low rates.

The business group approximates the average for the entire population considered in nearly every respect.

The skilled trade group stands out distinctly from the others in a number of respects. Its rates of impairments are excessively high for eye and ear, teeth, heart and pulse, and many miscellaneous conditions. The desirability of a study of the rates of impairments in the specific occupations making up this group is suggested.

Again, it should be emphasized that one could not expect in this study to find very marked differences, since the lower social levels are but slightly represented in the data.

ACKNOWLEDGMENTS

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ACUTE RESPONSE OF GUINEA PIGS TO VAPORS OF SOME NEW COMMERCIAL ORGANIC COMPOUNDS

V. VINYL CHLORIDE[1]

By F. A. PATTY, *Assistant Physiological Chemist*, W. P. YANT, *Supervising Chemist*, and C. P. WAITE, *Assistant Surgeon*,[2] *Health Laboratory Section, Pittsburgh Experiment Station, Bureau of Mines*

This report on the acute response of guinea pigs to vinyl chloride gas is the fifth of a series of similar reports which deal with studies pertinent to evaluating the hazards involved in exposure to some chemical products which have recently reached, or promise to reach, important domestic and industrial use. The first report of the series dealt with ethylene dichloride,[3] the second with ethyl benzene vapor,[4] the third with "Cellosolve" (ethylene glycol monoethyl ether),[5] and the fourth with ethylene oxide.[6]

Vinyl chloride is used at present only in the synthesis of organic compounds, principally resins.

The investigation described herein was undertaken at the request of the Carbide & Carbon Chemicals Corporation, and the work was conducted jointly by that corporation and the United States Bureau of Mines at the Pittsburgh Experiment Station of the Bureau of Mines.

SCOPE OF WORK

The scope of the work included a study of the toxicity of vinyl chloride and the physiological response to its vapors as determined by exposure of guinea pigs. Only acute effects as produced by a single exposure were studied. The experiments were planned to give information relative to the concentrations and periods of exposure which produce but slight response, moderate response, and serious response.

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[1] This report represents work done under cooperative agreement between the Bureau of Mines, Department of Commerce, and the Carbide & Carbon Chemicals Corporation. Published by permission of the Director, U. S. Bureau of Mines.

[2] Assistant surgeon, United States Public Health Service, detailed to the Bureau of Mines.

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DESCRIPTION OF MATERIAL USED FOR TESTS

Vinyl chloride (CH_2CHCl) is a colorless gas at room temperatures (boiling point, −13.9° C.). The gas has a pleasant ethereal odor and is slightly soluble in water. Its limits of inflammability are 4.0 to 21.7 per cent by volume in air.[7]

The vinyl chloride used in experiments described in this report was a commercial product having the following plant specifications: Boiling range, 95 per cent or more below −10° C. at 760 mm.; acetaldehyde, not more than 0.5 per cent; residue, not more than 0.5 per cent.

TEST APPARATUS

The test apparatus was the same as that described in a previous report dealing with ethylene oxide.[6]

COMPUTATION AND ANALYSIS OF GAS-AIR MIXTURES

The vinyl chloride-air mixtures were created by adjusting calibrated flowmeters (Venturi type) to give the desired proportions of gas and air. The vinyl chloride content was then checked by analysis.

The apparatus used was the same as that used for determining ethylene dichloride in air.[5] Briefly, the method was to subject the vinyl chloride to combustion with oxygen (explosion method using electrolytic gas to "energize" the combusiton), and absorption of the products of combustion. For mixtures containing insufficient oxygen for complete combustion, a known amount of additional air or pure oxygen was mixed with the sample before adding the electrolytic gas. A minimum amount of stopcock grease was used in the apparatus to reduce error through solubility of the gas. For the same reason rubber tubing was not used except for making joints of glass tubing, caution being taken to have the ends butt together.

TEST PROCEDURE, DESCRIPTION AND CARE OF ANIMALS

The test procedure, and the animals and their care were the same as described in the published report dealing with ethylene dichloride.[5]

RESULTS OF TESTS

The detailed test data are too voluminous to be presented in this report and only summarized results pertinent to symptoms, gross pathology, and fatality are given. Specimens of tissue were taken for microscopic examination, a report of which will be made later.

[5] See previous footnote 5.
[6] See previous footnote 6.
[7] Jones, G. W., U. S. Bureau of Mines, unpublished data.

SYMPTOMS OF ANIMALS

Control animals.—No symptoms were exhibited by the 18 control guinea pigs used in these tests or by the stock animals from which all of the test animals were taken. Also, no deaths occurred.

Exposed animals.—Table 1 gives the symptoms shown by the animals exposed to vapors of vinyl chloride and also the average period of exposure required to produce these symptoms by various concentrations of vapor in air. The reader should note that the figures in parentheses indicate that the particular symptom did not occur in the maximum period of test as given.

The highest concentration of vinyl chloride in air used in the exposures (40 per cent) exerted an almost immediate narcotic effect on the animals. Within one-fourth minute the animals fell to their sides in an apparent unconscious or narcose state, with convulsive twitchings of the trunk and extremities and jerky rapid respirations. The pigs remained in this state until death or termination of the test.

TABLE 1.—*Symptoms produced in guinea pigs during exposure to vapors of vinyl chloride*

Type of symptoms	Concentration of vapor and period of exposure producing symptoms [1]						
	40	15 to 25	10	5	2.5	1.0	0.5
Dropping to sides; incomplete narcosis; nervous phenomena; irregular twitching of extremities	¼	1	2	[2] (360)	[2] (480)	[2] (480)	[2] (480)
Unsteadiness on feet; motor ataxia	[2] (10)	[2] (29)	[2] (360)	2	5	[2] (480)	[2] (480)
Apparent unconsciousness; deep narcosis; no twitching of extremities; quiet	[2] (10)	16–20	60	50	90	[2] (480)	[2] (480)
Jerky, rapid respiration	¼–⅓	2	([3])	240	[2] (480)	[2] (480)	[2] (480)
Slow, shallow respiration	[2] (10)	20	120–360	360	360–480	[2] (480)	[2] (480)
Respirations ceased	10–20	18–55	[2] (360)	[2] (360)	[2] (480)	[2] (480)	[2] (480)

[1] Concentrations of vapor in per cent by volume; time in minutes.
[2] Not observed during maximum exposure period as given in parentheses.
[3] Not determined.

Concentrations of 10 to 25 per cent caused the animals to fall on their sides with convulsions and with jerky, rapid respirations in 1 to 2 minutes. Following this the pigs lapsed into a state of apparently deep narcosis in which the convulsive twitchings and all movements ceased, the pigs being quiet and relaxed. This occurred within 16 to 20 minutes at concentrations of 15 to 25 per cent and within 60 minutes at concentrations of 10 per cent. Slow, shallow respirations occurred with 20 minutes' exposure to 15 to 25 per cent and with 120 to 360 minutes' exposure to 10 per cent. The pigs remained in this state until death or termination of the exposure.

Concentrations of 5 and 2.5 per cent did not produce the initial symptom of "dropping to their sides and unconsciousness with convulsive twitching of the extremities." These concentrations produced first an unsteadiness in the animals, a staggering on attempt-

ing to move about, with signs of motor ataxia. This occurred within 2 to 5 minutes, and lasted 50 to 90 minutes, at the end of which time the pigs fell on their sides in an apparent profound narcosis, being entirely relaxed with no convulsions or movements of any kind. The respirations were increased in rate and amplitude, becoming

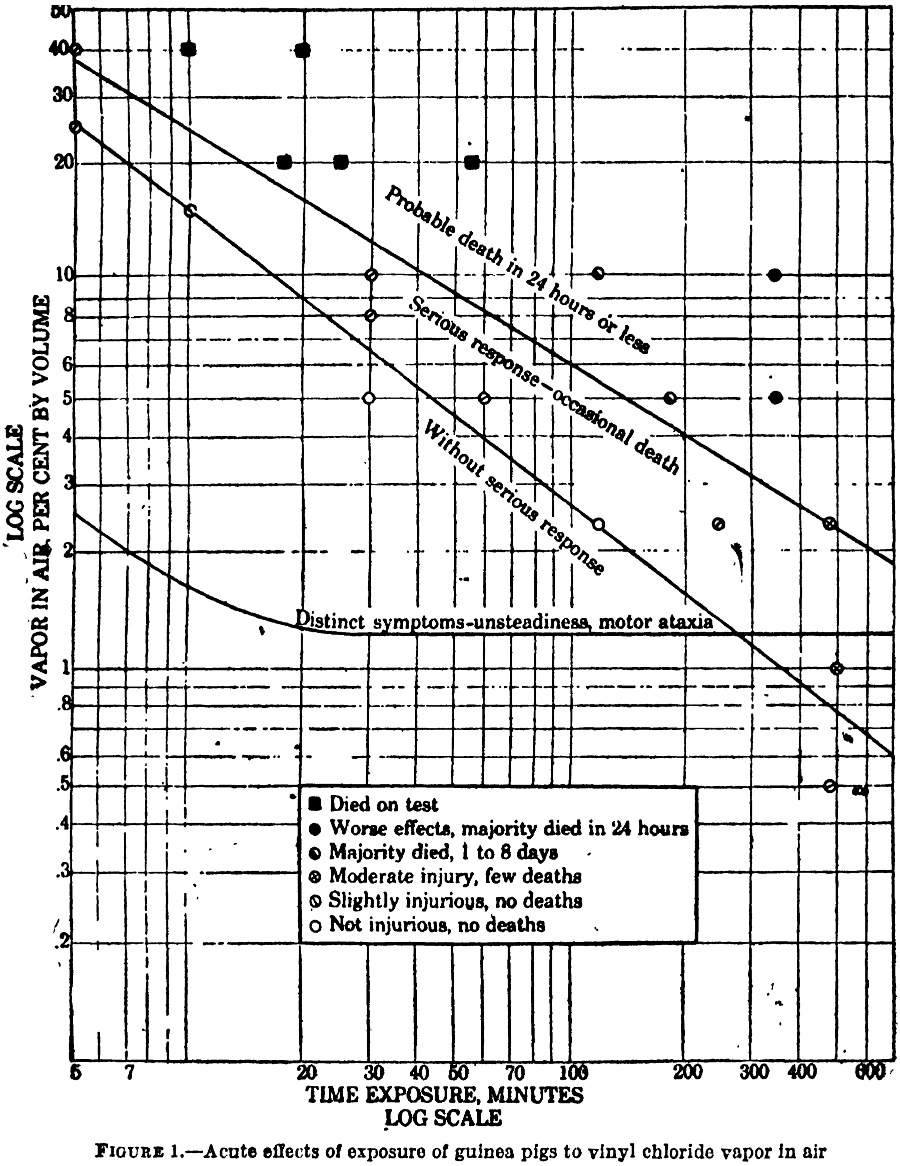

FIGURE 1.—Acute effects of exposure of guinea pigs to vinyl chloride vapor in air

rapid and jerky in character at the end of 240 minutes' exposure to 5 per cent, and slowed and became shallower at the end of 360 minutes, remaining in the latter condition until death or termination of the exposure.

Concentrations of 0.5 and 1.0 per cent did not produce any symptoms.

The general symptom of narcosis was manifested in three degrees, increasing in severity with increasing concentrations of vinyl chloride: (1) Unsteadiness, staggering, and motor ataxia; (2) incomplete narcosis in which convulsions affecting the trunk and extremities persist; (3) a state of profound or deep narcosis in which the animals are quiet, on their sides, relaxed, and without movement.

Observation showed that animals after being removed from the exposure chamber recovered from the most profound narcosis within 12 minutes.

No signs of eye or nasal irritation were observed.

SYMPTOMS EXPERIENCED BY MEN

Two of the experimenters were exposed to 2.5 per cent vinyl chloride in air for a period of approximately three minutes. They reported that the gas had a fairly pleasant odor. They soon began to feel dizzy and disoriented as to space and size of surrounding objects, and complained of a burning sensation in the soles of the feet. They immediately recovered on leaving the chamber and complained only of a slight headache, which lasted about 30 minutes.

GROSS PATHOLOGY

Control animals.—A total of 18 control animals were killed for autopsy. No gross pathology resembling that found in the exposed animals was found. Also no deaths occurred among the control animals.

Exposed animals.—The gross pathological changes found in the animals that died during exposure (see fig. 1 for conditions of exposure causing death on test) were intense congestion and edema of the lungs and a hyperemia of the kidneys and liver. The lungs were light pink in color; the cut section was uniformly light red, and bled freely. A frothy exudate was present in the large bronchi, and squeezing of the lung tissue covered the cut surface with a frothy, bloody fluid. The kidneys and liver were deep red to purple in color and the cut sections were moist and dripped blood.

The animals that died within 1 to 8 days following exposure showed a congestion and edema of the lungs, with a swelling and hyperemia of the kidneys. The findings in animals of these same groups which were killed for autopsy immediately after exposure showed a hyperemia and edema of the lungs, with a congestion of the liver and kidneys. Animals that were killed for autopsy 4 days following exposure still showed a hyperemia with areas of congestion throughout the lungs, whereas those killed for autopsy 8 days following exposure showed atelectatic and emphysematous patches throughout the lungs.

The findings in those animals that were killed immediately after exposure to conditions that did not cause death, but which caused

a mild degree of pathological change, were principally congestion and slight edema of the lungs, and hyperemia of the liver. The findings in the lungs were not as severe as noted in the exposures previously described. These changes cleared up in most of the animals within 8 days after exposure.

A clouding and thickening of the cortex of the kidneys was noted in those animals killed immediately after exposure to 25 per cent for 5 minutes and 5 per cent for 1 hour. This change was not noted in members of those groups killed 4 days and 8 days later.

No significant gross pathological changes were found in animals exposed to 15 per cent for 10 minutes, 5 per cent for 30 minutes, and 2.5 per cent for 2 hours.

DISCUSSION OF PATHOLOGY

Vinyl chloride is irritating to the lungs. Congestion and edema of the lungs are the most constant and prominent observations for exposure to conditions which caused death during or following exposure. Accompanying the lung changes was a passive congestion of the liver and kidneys.

The signs of lung irritation which were found immediately after exposure to conditions which did not cause death, practically disappeared within 8 days. A clouding and thickening of the cortex of the kidney was noted immediately after exposure to 25 per cent for 5 minutes and 5 per cent for 1 hour. These kidney changes were not present in animals of the same groups after 4 days.

FATALITY AND SUMMARY OF PHYSIOLOGICAL RESPONSE

A summary of the fatality and response of guinea pigs exposed to various concentrations of vinyl chloride in air is shown graphically in Figure 1, and given in conventional degrees of response in Table 2. The results of each experiment are designated by a symbol which represents one of six different degrees of severity. With the exception of concentrations causing death during exposure for which the results obtained for individual animals are given, the selected symbol describes the results obtained for at least one-half the individual animals, and in most cases the results are for the majority of a group (at least three and usually six animals) exposed to a given condition.

It will be noted from the legend on Figure 1 that the six degrees of response are—

1. Died on test.
2. Majority died within 24 hours.
3. Majority died, 1 to 8 days.
4. Moderate injury, few deaths.
5. Slightly injurious, no deaths.
6. Not injurious, no deaths.

In addition to representing the response of each group by symbols, the latter have been separated into four general fields or zones of probable response, namely,

1. Probable death, 24 hours or less.
2. Serious response, occasional death.
3. Without serious response.
4. Distinct symptoms.

Table 2 gives the concentrations which produce the degrees of response generally reported in the literature dealing with noxious gases. These data may be compared with toxicological data for other compounds.[3 4 5 6 8 9 10 11]

TABLE 2.—*Acute effects of exposure of guinea pigs to vinyl chloride in air*

Effects of exposure after various periods of time	Concentration, per cent by volume
1. Kills in a very short time	20 to 40
2. Serious symptoms in a very short time	10
3. Moderate symptoms in a very short time	2.5 to 5
4. Dangerous to life in 30 to 60 minutes	10
5. Marked symptoms in 30 to 60 minutes	5
6. Maximum amount for 60 minutes without serious disturbances leading to death	5 to 7
7. Maximum amount for 60 minutes without marked symptoms	1.0 to 1.5
8. Maximum amount for several hours without serious disturbances	0.5
9. Maximum amount for several hours with but slight or no symptoms	1.0

CAUSE OF DEATH DURING AND FOLLOWING EXPOSURE

The animals exposed to 20 to 40 per cent vinyl chloride entered a state of profound narcosis which terminated in death. Recovery was rapid and without fatality following exposure for periods less than those causing death during exposure. This indicated that the degree of lung irritation acquired in these relatively short periods was insufficient to cause death. With concentrations in the range of 5 to 10 per cent the period between a profound but nonfatal narcose state and death was much longer, and permits considerable lung irritation to take place. Also, there was a probable action of vinyl chloride or products of its decomposition on the liver and kidneys. With 2.5 per cent, profound narcosis was present after 90 minutes and irritation of the lungs occurred after several hours, but death was exceptional.

[3 4 5 6] See previous footnotes 3, 4, 5, 6.

[8] Cotton, R. T., and Young, H. D.: The use of carbon dioxide to increase the insecticidal efficiency of fumigants. Proc. Entomological Soc. of Washington, vol. 31 (1929), pp. 97-102.

[9] Sayers, R. R., Yant, W. P., Thomas, B. G. H., and Berger, L. B.: Physiological response attending exposure to vapors of methyl bromide, methyl chloride, ethyl bromide, and ethyl chloride. Pub. Health Bul. No. 185 (1929), 56 pp.

[10] International Critical Tables, first edition (1927), vol. 2, p. 318. Also see errata sheet, vol. 2.

[11] Henderson, Yandell, and Haggard, Howard W.: Noxious gases. American Chemical Society Monograph No. 35, 1927. Chemical Catalogue Co., New York.

With regard to symptoms and pathology, as well as the effecting concentrations, the response of guinea pigs to vinyl chloride appears to be similar to their response to ethyl chloride.[8] In equal concentrations and for single exposures, vinyl chloride is less harmful than gasoline, benzene, chloroform, and carbon tetrachloride.

The comparatively harmless response to concentrations of vinyl chloride that will maintain a narcose state, together with its rather pleasant odor, suggests a possible use for producing surgical anaesthesia. This could be produced quickly by high concentrations and maintained with lower concentrations. Much additional work is necessary, however, to ascertain the practicability of its use.

Vinyl chloride does not possess adequate warning properties of the odor or irritation type. With concentrations of 5 per cent or less, however, it gives warning by producing symptoms of dizziness and disorientation in advance of harm. With higher concentrations the narcotic action is very rapid and persons would have little time to heed the warning symptoms before helplessness would ensue.

Vinyl chloride boils at less than ordinary room temperatures. As a rule, it is contained in cylinders under pressure. This is conducive to escape of the gas; on the other hand, the high concentrations required to produce physiological harm minimize the danger from leakage. There is, in fact, more danger from explosion than from harm to health from exposure.

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SUMMARY AND CONCLUSIONS

The acute physiological response of guinea pigs to air containing vinyl chloride was determined. The concentrations of vapor and periods of exposure ranged from those which produced death to those which caused no apparent effect after several hours' exposure. The symptoms, gross pathology, and fatality are given with a discussion of potential hazards.

1. The symptoms are principally those of narcosis. They range from unsteadiness and motor ataxia to incomplete and, finally, com-

[8] See previous footnote 8.

plete narcosis. The respirations vary from a rapid, jerky type accompanying the beginning of narcosis to a later, slow, shallow type.

2. The principal gross pathological findings were congestion and edema of the lungs, with hyperemia of the kidneys and liver.

3. Exposure to 20 to 40 per cent kills guinea pigs in a very short time; 10 per cent is dangerous to their lives after 30 to 60 minutes' exposure; and 0.5 per cent is the maximum allowable amount for several hours without acute disturbances of a serious nature.

4. With regard to relative toxicity (concentrations causing acute harm), vinyl chloride is less harmful than carbon tetrachloride and chloroform, and is similar to ethyl chloride.

5. The danger from explosion exceeds the health hazard from exposure.

6. Vinyl chloride does not possess adequate warning properties of the odor or irritation type. It gives warning, however, by producing symptoms of dizziness and disorientation in advance of harm, except when present in exceedingly high concentrations which would cause almost immediate helplessness and unconsciousness.

7. The narcotic action of vinyl chloride and its comparatively low toxicity suggest its possible use for surgical anaesthesia.

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for June and First Six Months of 1930

The accompanying tables are taken from the Statistical Bulletin for July, 1930, issued by the Metropolitan Life Insurance Co. They present the mortality record of the industrial insurance department of the company for June, 1930, as compared with the preceding month and with the corresponding month of last year, and also give the rates, by white and colored policyholders, for the first six months of the years 1928, 1929, and 1930. Death rates are given for the principal causes of death, and are based on a strength of approximately 19,000,000 insured persons.

It should be remembered that these rates apply to a more or less selected group of persons. In recent years the general death rate for this group has been approximately 73 per cent of the rate for the registration area of the United States.

JUNE, 1930

The death rate for June among these persons was 8.3 per 1,000, the same as for June of last year, and the lowest rate for the month in the mortality records of the company.

As compared with June of last year, improvement is noted for diphtheria, influenza, tuberculosis, pneumonia, accidents, and homi-

cides, while higher mortality rates are recorded for heart disease, chronic nephritis, and suicides; and June was the sixth successive month of 1930 to record a higher death rate for automobile fatalities than the corresponding month of last year.

Death rates (annual basis) per 100,000 for principal causes of death, June, 1930

[Industrial Department, Metropolitan Life Insurance Co.]

Cause of death	Rate per 100,000 lives exposed [1]				
	June, 1930	May, 1930	June, 1929	Cumulative, January-June	
				1930	1929
Total, all causes	832.5	870.2	834.5	924.4	1,051.2
Typhoid fever	1.9	1.2	2.4	1.3	1.7
Measles	5.5	6.0	4.9	4.7	4.6
Scarlet fever	2.1	2.6	2.2	3.4	3.5
Whooping cough	3.9	4.4	4.8	4.6	6.5
Diphtheria	3.6	5.7	7.6	7.1	9.7
Influenza	7.9	13.9	10.1	21.2	73.5
Tuberculosis (all forms)	82.8	84.5	88.7	85.6	95.0
Tuberculosis of respiratory system	71.9	73.5	77.4	74.2	84.3
Cancer	76.1	73.0	75.1	76.1	77.9
Diabetes mellitus	15.6	18.3	14.1	19.6	21.0
Cerebral hemorrhage	57.6	59.5	[2] 51.1	62.1	[2] 62.4
Organic diseases of heart	139.6	143.5	133.0	156.5	166.2
Pneumonia (all forms)	58.4	89.1	62.5	101.6	126.5
Other respiratory diseases	11.8	12.0	11.4	12.5	14.5
Diarrhea and enteritis	15.9	11.3	16.7	12.5	14.4
Bright's disease (chronic nephritis)	69.9	67.5	61.4	71.2	75.6
Puerperal state	12.0	11.5	11.4	12.9	14.4
Suicides	9.9	10.1	8.2	9.6	9.0
Homicides	4.9	5.9	6.3	6.2	6.4
Other external causes (excluding suicides and homicides)	61.9	56.3	65.4	57.3	59.8
Traumatism by automobiles	20.1	19.0	19.6	18.2	17.2
All other causes	191.3	193.9	197.2	198.6	208.7

[1] All figures in this table include insured infants under 1 year of age. The rates for 1930 are subject t slight correction, as they are based on provisional estimates of lives exposed to risk.
[2] Rate not comparable with that for 1930.

FIRST SIX MONTHS OF 1930

With regard to health conditions in this large group of insured persons for the first half of 1930, as reflected in the mortality rates, the Bulletin states—

A new record for low mortality for the first half of any year has been registered for the winter and spring seasons of 1930. This applies to Canada as well as to the United States. In the latter, the white population has enjoyed better health than during the corresponding period of any previous year; and the death rate of the colored people has never been so low—with a single exception. The improvement has probably extended to all ages of the population—although this can not be stated unreservedly at this writing. It is certain, nevertheless, that the chief scourges of childhood are taking a smaller death toll than ever before; that tuberculosis, which causes death chiefly in early adult and middle life, is recording a death rate far below the previous minimum; and that the mortality rates from several diseases, which are important factors in later life, have shown noteworthy declines in 1930.

As in 1929, a large reduction in the tuberculosis death rate to a new minimum bids fair to be the outstanding public-health fact of the year. The figure for

the first half of 1930 was 85.6 deaths per 100,000 policyholders. This marks a reduction of almost 10 per cent in a single year from the previous minimum, 95 per 100,000 in 1929. Both white and colored policyholders have shared in the decline, with the former showing the greater drop in the death rate.

Death rates (annual basis) per 100,000 for principal causes of death, first six months of 1928, 1929, and 1930

[Industrial Department, Metropolitan Life Insurance Co.]

Cause of death	Death rates per 100,000 persons exposed [1]					
	White			Colored		
	January-June, 1930	January-June, 1929	January-June, 1928	January-June, 1930	January-June, 1929	January-June, 1928
All causes of death	838.6	952.2	898.5	1,514.3	1,731.9	1,616.9
Typhoid fever	1.1	1.4	1.7	2.5	3.5	2.7
Measles	5.0	5.0	8.7	2.6	2.0	8.1
Scarlet fever	3.7	3.8	4.0	1.0	1.1	1.7
Whooping cough	4.6	5.9	5.8	4.5	10.3	8.8
Diphtheria	7.7	10.2	12.3	3.3	6.6	6.2
Influenza	17.0	64.6	28.5	49.7	134.4	62.0
Meningococcus meningitis	3.7	5.5	2.2	11.7	9.7	2.9
Tuberculosis (all forms)	67.1	75.0	76.3	212.5	232.7	242.1
Tuberculosis of respiratory system	58.0	66.5	66.9	185.5	207.0	212.0
Tuberculosis of the meninges, etc.	4.1	3.9	4.4	6.5	4.9	8.2
Other forms of tuberculosis	5.1	4.6	5.0	20.5	20.8	22.0
Cancer	76.5	77.8	76.1	72.8	78.7	77.2
Diabetes	19.3	20.7	18.9	21.2	23.3	21.4
Alcoholism	2.9	3.2	2.8	4.8	5.7	5.3
Cerebral hemorrhage; apoplexy	53.7	[2] 55.5	[2] 54.4	120.1	[2] 109.9	[2] 104.2
Organic diseases of the heart	142.0	151.5	141.1	256.5	267.5	239.3
Total respiratory diseases	104.0	127.1	121.2	184.2	236.6	243.4
Bronchitis	3.9	4.5	4.9	4.8	6.2	7.2
Broncho-pneumonia	38.2	48.6	45.2	51.7	71.7	81.8
Pneumonia (lobar and undefined)	53.7	64.8	62.2	116.7	144.6	140.9
Other diseases of respiratory system	8.2	9.1	8.9	10.9	14.2	13.4
Diarrhea and enteritis	12.4	14.2	15.9	12.8	15.6	17.4
Under 2 years	9.7	11.4	12.9	7.0	9.3	12.1
2 years and over	2.7	2.8	2.9	5.8	6.4	5.4
Acute nephritis	3.4	3.9	4.2	14.3	13.8	13.0
Chronic nephritis	62.4	67.2	67.9	131.6	133.2	136.0
Total puerperal state	12.2	13.2	13.7	.18.0	22.9	21.0
Total external causes	68.9	69.9	67.1	102.1	110.9	104.8
Suicides	10.0	9.3	8.8	6.8	6.7	6.2
Homicides	3.2	2.9	2.8	27.0	30.3	30.5
Accidental and unspecified violence	55.7	57.7	55.5	68.4	73.9	68.1
Automobile accidents	18.3	17.3	15.3	17.0	16.2	16.6
All other and ill-defined causes of death	171.1	176.7	175.7	288.0	313.4	299.4

[1] All figures in this table include insured infants under one year of age. The figures for 1930 are subject to slight correction, as they are based on provisional estimates of lives exposed to risk.

[2] Rate not comparable with that for 1930.

The improvement in the diphtheria mortality rate is also an outstanding item in the health record of 1930, to date, and is second in importance to the splendid record for tuberculosis. The diphtheria death rate has dropped approximately 27 per cent in a single year. Unless unexpected epidemic prevalence of this disease is encountered at some time during the latter half of the year, 1930 will not only register a new minimum death rate for diphtheria, but will mark the largest year-to-year drop ever recorded.

Still another favorable item in the 1930 health report is the record for diseases related to childbearing, which have every prospect of recording a new minimum death rate this year.

The absence of any widespread prevalence of influenza has resulted in about the normal winter and spring death rate for that disease. This is in marked

contrast to what happened in 1929, when a major influenza epidemic exacted a large death toll during the winter. The drop in influenza mortality has been reflected in a considerable decline for pneumonia. The decreases recorded this year for heart disease and chronic nephritis are also due, in part, to the lower prevalence of influenza which, when epidemic, always hastens the deaths of many persons who suffer from chronic diseases.

The decline in the cancer death rate has persisted throughout the half year. If this improvement should be maintained throughout 1930, the first break since 1924 in the upward course of the cancer mortality rate will result.

The diabetes death rate (19.6 per 100,000) may be compared with 21 for the like period of 1929. There is a fair prospect that the upward course of the mortality from this disease will be checked this year, after rising continuously for five years.

The mortality from automobile accidents is higher than ever before at this time of the year. The estimated loss of life in the United States from this cause in 1929 was 31,400, which will probably be exceeded this year.

COURT DECISION RELATING TO PUBLIC HEALTH

Retail seller of soda-water beverages, holding State license, not required to procure municipal license.—(Wisconsin Supreme Court; Janke *v.* City of Milwaukee et al., 231 N. W. 261; decided June 11, 1930.) The plaintiff was the proprietor of a drug store where he sold soda-water beverages at retail to be consumed on the premises. He held a State license to manufacture and deal in soda-water beverages. An ordinance of Milwaukee prohibited the sale and manufacture, without a license from the city, of nonintoxicating liquors to be consumed upon the premises. The enforcement of this ordinance was sought to be enjoined by the plaintiff.

Chapter 96 of the 1929 laws provided that no person, firm, or corporation, possessing a State license such as held by plaintiff, should be required to procure a municipal license under the State prohibition act then in force. The prohibition act gave municipal corporations the power to license those who manufactured and dealt in nonintoxicating liquor. Chapter 129 of the 1929 laws repealed the prohibition law but gave to municipalities exactly the same power to license manufacturers and vendors of nonintoxicating liquor that was conferred by the prohibition act. In a prior case,[1] the supreme court had decided that the passage of chapter 129 did not evidence a legislative intent to change the exemption contained in chapter 96 and held that a municipal license was not required of a company which was engaged in the manufacture, bottling, and sale of soda-water beverages at wholesale and which held a State license therefor. The only material difference between the facts in such previous case and in the instant case was that in the prior case the plaintiff company manufactured and sold at wholesale beverages which were not consumed on its premises, while in the present case the plaintiff manufactured and sold at retail beverages to be consumed on his premises.

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[1] See Public Health Reports, Feb. 28, 1930, p. 446.

Under the law no one was permitted to "engage in the business of manufacturing or bottling any soda-water beverages *or of selling such beverage*" without first obtaining a State license. The supreme court said that the italicized words clearly included all vendors of such beverages, whether they sold at retail or at wholesale, and regardless of the place of consumption, and held that the exemption from procuring a municipal license was applicable to the plaintiff and others similarly situated who were licensed to manufacture and deal in soda-water beverages, whether they sold at wholesale or retail, for consumption on or off their premises, to the same extent as it was held in the prior case mentioned to exempt those who manufactured and sold at wholesale.

DEATHS DURING WEEK ENDED AUGUST 2, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended August 2, 1930, and corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

	Week ended August 2, 1930	Corresponding week, 1929
Policies in force	75, 961, 722	74, 565, 536
Number of death claims	13, 785	11, 706
Death claims per 1,000 policies in force, annual rate	9. 5	8. 2

Deaths [1] from all causes in certain large cities of the United States during the week ended August 2, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census. Cities whose population was found to be less than was indicated by estimates heretofore used will therefore appear as having a higher death rate than usual, even though there may have been no material increase in the actual number of deaths.]

City	Week ended Aug. 2, 1930				Corresponding week, 1929		Death rate [2] for first 31 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3] [4]	Death rate [2]	Deaths under 1 year	1930	1929
Total (78 cities)	7, 236	10. 9	647	[5] 52	10. 7	705	12. 6	13. 5
Akron	31	6. 4	3	27	6. 6	6	8. 1	9. 9
Albany [6]	28	11. 4	4	87	18. 6	4	15. 3	17. 0
Atlanta	59	11. 5	7	74	9. 5	11	16. 8	16. 7
White	28		3	95		8		
Colored	31	(7)	4	63	(7)	3	(7)	(7)
Baltimore [6]	245	15. 9	23	78	13. 0	25	14. 7	15. 6
White	179		14	60		23		
Colored	66	(7)	9	146	(7)	2	(7)	(7)
Birmingham	69	13. 9	14	131	14. 1	13	14. 5	17. 2
White	27		10	154		6		
Colored	42	(7)	4	95	(7)	7	(7)	(7)
Boston	162	10. 8	10	28	12. 2	22	14. 8	16. 8
Bridgeport	20	7. 1	1	17	8. 2	2	11. 9	13. 0
Buffalo	120	10. 9	12	53	11. 2	14	13. 5	14. 8
Cambridge	21	9. 6	0	0	7. 8	1	12. 4	13. 6
Camden	82	14. 2	5	91	13. 8	2	14. 5	15. 4
Canton	23	11. 3	2	50	7. 5	1	10. 6	12. 2
Chicago [6]	631	9. 7	54	48	10. 0	59	10. 9	12. 0
Cincinnati	144	16. 7	11	65	14. 4	16	16. 2	18. 0

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended[1] August 2, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929—Continued

City	Week ended Aug. 2, 1930				Corresponding week, 1929		Death rate[2] for first 31 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3] [4]	Death rate[2]	Deaths under 1 year	1930	1929
Cleveland	148	8.5	12	36	13.2	15	11.7	13.5
Columbus	85	15.3	9	88	11.8	4	16.9	15.8
Dallas[4]	71	14.1	5	-------	8.8	7	12.1	12.4
White	52	-------	5	-------	-------	7	-------	-------
Colored	19	(7)	0	-------	(7)	0	(7)	(7)
Dayton	49	12.7	4	59	11.4	6	10.6	12.1
Denver	70	12.7	10	104	13.0	6	14.8	15.5
Des Moines	33	12.0	2	35	7.7	0	12.3	12.2
Detroit	231	7.6	22	34	10.0	36	9.9	11.9
Duluth	12	6.2	0	0	8.8	1	11.5	12.0
El Paso[4]	29	14.8	6	-------	17.6	9	18.5	21.5
Erie	20	9.0	0	0	8.2	1	11.5	13.1
Fall River[6] [8]	20	9.1	1	23	11.4	2	12.9	15.3
Flint	27	8.9	5	58	7.2	7	9.5	11.3
Fort Worth[4]	33	10.7	5	-------	8.2	5	11.6	13.4
White	27	-------	4	-------	-------	5	-------	-------
Colored	6	(7)	1	-------	(7)	0	(7)	(7)
Grand Rapids	27	8.3	2	30	8.8	3	10.9	10.5
Houston[4]	45	8.0	5	-------	11.1	6	12.7	13.3
White	30	-------	3	-------	-------	5	-------	-------
Colored	15	(7)	2	-------	(7)	1	(7)	(7)
Indianapolis	91	13.0	8	60	12.7	13	14.9	15.3
White	77	-------	5	43	-------	10	-------	-------
Colored	14	(7)	3	161	(7)	3	(7)	(7)
Jersey City	57	9.4	5	43	10.4	9	12.0	13.5
Kansas City, Kans	18	7.7	1	24	12.9	3	11.4	14.2
White	10	-------	1	27	-------	2	-------	-------
Colored	8	(7)	0	0	(7)	1	(7)	(7)
Kansas City, Mo	102	13.5	10	78	12.2	8	13.9	14.7
Knoxville	28	13.7	3	70	16.6	8	14.4	14.3
White	25	-------	2	52	-------	5	-------	-------
Colored	3	(7)	1	247	(7)	3	(7)	(7)
Los Angeles	235	9.8	18	55	8.6	23	11.4	11.8
Louisville	120	20.3	8	70	8.5	8	14.0	15.7
White	102	-------	7	69	-------	6	-------	-------
Colored	18	(7)	1	72	(7)	2	(7)	(7)
Lowell[8]	23	12.0	1	24	5.7	1	14.3	15.5
Lynn	22	11.2	2	51	7.7	3	11.3	12.1
Memphis	100	20.6	12	143	15.3	7	18.3	19.9
White	46	-------	7	129	-------	4	-------	-------
Colored	54	(7)	5	169	(7)	3	(7)	(7)
Milwaukee	99	9.0	10	50	9.7	14	10.3	11.8
Minneapolis	89	10.0	6	30	9.1	3	10.9	11.6
Nashville	55	19.5	10	155	18.5	9	17.8	20.0
White	34	-------	6	123	-------	4	-------	-------
Colored	21	(7)	4	253	(7)	5	(7)	(7)
New Bedford[8]	14	6.5	2	51	9.7	2	11.7	13.6
New Haven	32	10.3	1	19	14.1	3	13.7	14.0
New Orleans	123	14.0	16	95	14.8	12	18.3	18.5
White	73	-------	13	115	-------	9	-------	-------
Colored	50	(7)	3	50	(7)	3	(7)	(7)
New York	1,225	9.1	99	42	9.4	119	11.4	12.2
Bronx Borough	180	7.3	9	21	6.9	16	8.3	8.9
Brooklyn Borough	379	7.6	39	41	8.3	41	10.3	11.0
Manhattan Borough	494	13.9	45	74	13.5	48	17.2	17.8
Queens Borough	128	6.1	3	87	7.2	12	7.5	8.0
Richmond Borough	44	14.5	3	56	12.2	2	15.0	16.6
Newark, N. J	82	9.6	7	37	11.2	8	12.7	13.7
Oakland	52	9.5	4	48	11.0	3	11.2	11.8
Oklahoma City	85	9.9	7	137	10.1	3	10.8	11.2
Omaha	68	16.5	10	114	14.7	5	14.8	14.5
Paterson	27	10.2	2	35	11.0	1	12.8	14.5
Philadelphia	494	13.1	60	89	9.9	19	13.1	14.0
Pittsburgh	162	12.6	22	81	10.8	16	14.5	15.8
Portland, Oreg	57	9.9	0	0	11.6	5	12.9	13.4
Providence	46	9.5	2	18	10.4	5	14.0	15.7
Richmond	50	14.2	3	44	14.0	9	15.6	17.5
White	32	-------	1	22	-------	4	-------	-------
Colored	18	(7)	2	87	(7)	5	(7)	(7)

Footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended August 2, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929*—Continued

City	Week ended Aug. 2, 1930				Corresponding week, 1929		Death rate[2] for first 31 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3 4]	Death rate[2]	Deaths under 1 year	1930	1929
Rochester	64	10.2	5	44	9.5	2	12.2	13.2
St. Louis	224	14.2	10	32	15.0	16	15.0	15.7
St. Paul	41	7.9	1	10	6.0	2	10.6	11.1
Salt Lake City[6]	28	10.4	2	31	11.7	2	13.1	13.9
San Antonio[4]	55	11.2	11		13.5	8	16.2	15.5
San Diego	32	11.2	0	0	8.4	3	14.7	16.3
San Francisco	160	13.3	6	41	9.9	4	13.6	13.7
Schenectady	18	9.8	2	62	6.6	2	11.8	13.2
Seattle	61	8.7	3	30	11.0	7	11.2	11.5
Somerville	18	9.0	2	65	7.1	3	10.4	9.9
Spokane	19	8.6	0	0	15.0	3	12.8	13.7
Springfield, Mass	29	10.1	1	16	7.4	2	12.8	13.4
Syracuse	46	11.5	4	50	9.4	3	12.3	13.9
Tacoma	26	12.7	2	51	9.3	3	12.8	12.3
Toledo	67	12.0	4	37	9.6	4	13.2	14.3
Trenton	57	24.2	3	56	14.1	3	17.4	18.1
Utica	28	14.2	2	57	13.8	1	15.6	16.5
Washington, D. C	146	15.6	14	81	15.2	15	15.8	16.4
White	86		7	60		7		
Colored	60	(7)	7	124	(7)	8	(7)	(7)
Waterbury	15	7.7	0	0	7.8	1	10.3	10.2
Wilmington, Del.[8]	21	10.4	2	45	17.3	5	15.0	14.8
Worcester	36	9.5	4	52	8.8	6	13.5	13.5
Yonkers	21	8.1	0	0	7.9	3	8.3	9.5
Youngstown	33	10.1	6	94	9.9	4	10.5	12.8

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births.
[4] Cities left blank are not in the registration area for births.
[5] Data for 73 cities.
[6] Deaths for week ended Friday.
[7] For the cities for which deaths are shown by color the colored population in 1920 constituted the following per cents of the total population: Atlanta 31, Baltimore 15, Birmingham 39, Dallas 15, Fort Worth 14, Houston 25, Indianapolis 11, Kansas City, Kans. 14, Knoxville 15, Louisville 17, Memphis 38, Nashville 30, New Orleans 26, Richmond 32, and Washington, D. C., 25.
[8] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended August 9, 1930, and August 10, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 9, 1930, and August 10, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929
New England States:								
Maine	4	2	1		4	10	1	0
New Hampshire						23	0	0
Vermont	1	2			3	1	0	0
Massachusetts	35	48			56	49	3	5
Rhode Island	5	2			6		0	0
Connecticut	5	16			8	11	0	2
Middle Atlantic States:								
New York	56	121	[1] 3	[1] 6	230	123	21	19
New Jersey	31	39	1	2	109	25	5	7
Pennsylvania	48	80			166	123	4	7
East North Central States:								
Ohio	12	41	3	8	9	48	8	8
Indiana	13	5			6	8	4	1
Illinois	64	112	1	5	25	122	6	11
Michigan	36	58	1		71	58	6	19
Wisconsin	11	31	4	14	79	117	2	3
West North Central States:								
Minnesota	10	13			9	17	2	1
Iowa	3	5			1	9	2	1
Missouri	17	15	1	1	17		6	8
North Dakota		2			1	17	0	0
South Dakota	7	7				2	2	0
Nebraska	7	1			8	30	0	1
Kansas	1	9			14	28	1	1
South Atlantic States:								
Delaware	2	1					0	0
Maryland [2]	3	4			3	6	0	0
District of Columbia	3	6		1	5		0	0
Virginia								
West Virginia	7	8		2	21	5	0	4
North Carolina	33	51			2	1	2	0
South Carolina	19	23	38	126	4		0	0
Georgia	4	12	3	17	12	3	0	0
Florida	1	18	1	1	6		0	2

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 9, 1930, and August 10, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929
East South Central States:								
Kentucky	9	6			10		2	0
Tennessee	8	8	1		10	1	3	0
Alabama	9	21	4	6	24	6	4	0
Mississippi	5	15					1	
West South Central States:								
Arkansas	1	4	6			1	0	0
Louisiana	5	17	5	4	7	3	1	2
Oklahoma [3]	5	13	4	15	1	3	1	0
Texas	22	33		6	21	6	1	0
Mountain States:								
Montana		4			4	33	0	1
Idaho					8	1	0	0
Wyoming		1			2		0	2
Colorado	3	6			11	3	1	0
New Mexico	6	2			1		0	0
Arizona	2				9		0	3
Utah [1]			4	1	6	1	2	1
Pacific States:								
Washington	12	6	3	1	20	14	1	0
Oregon	6	5	7	1	16	20	0	1
California	41	32	6	8	84	17	2	5

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929
New England States:								
Maine	3	0	13	2	0	0	2	2
New Hampshire	1	1	1	4	0	0	2	0
Vermont	0	0	1	0	0	8	0	0
Massachusetts	23	1	48	41	0	0	5	10
Rhode Island	0	2	3	6	0	0	0	2
Connecticut	0	2	8	16	0	0	0	0
Middle Atlantic States:								
New York	25	25	51	66	0	1	27	45
New Jersey	1	1	23	24	0	0	8	7
Pennsylvania	8	8	52	76	0	2	37	46
East North Central States:								
Ohio	14	4	33	41	11	15	33	30
Indiana	2	0	10	27	33	18	13	3
Illinois	11	1	51	91	19	15	32	29
Michigan	0	7	53	84	17	30	18	8
Wisconsin	1	1	19	18	6	13	4	3
West North Central States:								
Minnesota	15	0	15	36	4	0	6	3
Iowa	1	0	8	6	19	8	2	5
Missouri	9	2	16	12	12	2	18	17
North Dakota	2	0	1	2	0	7	1	3
South Dakota	1	0	1	1	14	6	1	0
Nebraska	1	0	4	12	12	8	6	2
Kansas	23	0	11	21	11	9	17	27
South Atlantic States:								
Delaware	0	0	1	0	0	0	4	5
Maryland [1]	0	0	7	19	0	0	60	17
District of Columbia	0	1	1	3	0	0	2	1
Virginia	2	21			1			
West Virginia	1	2	8	12	1	2	30	15
North Carolina	4	11	19	37	3	7	66	44
South Carolina	3	2	4	10	0	0	69	72
Georgia	1	0	13	16	0	0	58	25
Florida	0	0	1	1	0	0	1	9

[1] Week ended Friday.

[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 9, 1930, and August 10, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929	Week ended Aug. 9, 1930	Week ended Aug. 10, 1929
East South Central States:								
Kentucky	0	0	5	27	10	0	79	37
Tennessee	0	6	11	7	1	1	77	76
Alabama	0	2	16	15	0	0	32	30
Mississippi	3	1	2	8	1	0	34	39
West South Central States:								
Arkansas	6	0	1	7	4	0	26	29
Louisiana	27	0	6	3	0	0	40	29
Oklahoma [3]	9	2	6	16	22	6	70	70
Texas	2	0	22	18	12	13	35	24
Mountain States:								
Montana	0	0	6	5	1	3	2	3
Idaho	0	0	3	1	0	11	0	1
Wyoming	0	0	1	2	0	3	0	2
Colorado	0	0	5	0	0	0	6	0
New Mexico	0	0	0	4	1	2	3	11
Arizona	0	0	2	1	0	2	1	0
Utah [2]	0	0	3	8	0	0	1	1
Pacific States:								
Washington	1	1	13	5	22	0	4	2
Oregon	0	1	1	4	3	7	10	8
California	56	4	34	76	15	31	25	17

[2] Week ended Friday. [3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June, 1930										
Georgia	9	13	29	401	416	140	0	41	8	100
Kansas	5	43	6	4	839	1	1	123	298	29
Mississippi	8	27	408	7,078	231	2,124	3	13	12	189
New Hampshire		3					1	18		
Texas	3	51	64	1,081		2	7	56		61
July, 1930										
Arizona	7	2			161		6	7	5	37
Arkansas	1	9	25	418	19	148	20	10	21	154
Connecticut	10	34	3	1	70		5	43	0	7
Indiana	15	34	5	4	148		21	122	275	32
Maine	1	21	2	2	63		0	57	0	2
Michigan	38	207	3	21	797		3	331	148	31
North Dakota	2	6			25		1	22	38	6
Wyoming		2	1		51		0	14	13	1

June, 1930	Cases
Chicken pox:	
Georgia	25
Kansas	178
Mississippi	337
Dengue:	
Mississippi	2
Dysentery:	
Georgia	175
Mississippi (amebic)	111
Mississippi (bacillary)	3,393
Conjunctivitis:	
Georgia	1
German measles:	
Kansas	2
Hookworm disease:	
Georgia	64
Mississippi	314
Lethargic encephalitis:	
Georgia	1
Kansas	2
Mumps:	
Georgia	67
Kansas	211
Mississippi	406
Ophthalmia neonatorum:	
Mississippi	14
Puerperal septicemia:	
Mississippi	35
Rabies in animals:	
Mississippi	10
Rabies in man:	
Kansas	1
Septic sore throat:	
Georgia	69
Kansas	2
Tetanus:	
Kansas	3
Trachoma:	
Georgia	1
Mississippi	9
Tularaemia:	
Kansas	2
Typhus fever:	
Georgia	4
Undulant fever:	
Georgia	3
Kansas	4
Vincent's angina:	
Kansas	1
Whooping cough:	
Georgia	149
Kansas	338
Mississippi	1,432

July, 1930	Cases
Chicken pox:	
Arizona	6
Arkansas	11
Connecticut	74
Indiana	44
Maine	39
Michigan	310
North Dakota	15
Wyoming	3
Conjunctivitis:	
Maine	2
Dysentery:	
Arizona	1
German measles:	
Connecticut	38
Maine	6
Wyoming	2
Hookworm disease:	
Arkansas	4
Impetigo, bulbus:	
Indiana	1
Lead poisoning:	
Connecticut	2
Lethargic encephalitis:	
Michigan	3
North Dakota	2
Mumps:	
Arizona	11
Arkansas	4
Connecticut	61
Indiana	11
Maine	88
Michigan	166
North Dakota	25
Wyoming	4
Ophthalmia neonatorum:	
Indiana	1
Rabies in animals:	
Connecticut	6
Rabies in man:	
Indiana	2
Rocky Mountain spotted or tick fever:	
Wyoming	7
Septic sore throat:	
Connecticut	1
Indiana	1
Maine	1
Michigan	2
Tetanus:	
Connecticut	1
Trachoma:	
Arizona	5
Tularaemia:	
Wyoming	1
Undulant fever:	
Arizona	1
Connecticut	1
Indiana	5
Michigan	3
Vincent's angina:	
Maine	4
North Dakota	29
Whooping cough:	
Arizona	17
Arkansas	96
Connecticut	153
Indiana	147
Maine	117
Michigan	843
North Dakota	46
Wyoming	9

Cases of Certain Communicable Diseases Reported for the Month of April, 1930, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	181	3	199	321	152	0	83	10	113
New Hampshire	--------	5	--------	--------	77	0	--------	2	--------
Vermont	85	4	381	29	45	18	13	2	18
Massachusetts	857	284	5, 751	809	1, 206	0	583	20	1, 315
Rhode Island	71	36	21	1	142	0	58	1	127
Connecticut	459	57	172	146	420	0	171	5	181
New York	2, 657	581	7, 671	3, 029	2, 368	35	1, 934	69	1, 601
New Jersey	959	462	5, 864	--------	1, 030	0	517	13	430
Pennsylvania	2, 751	512	6, 409	1, 876	2, 080	5	712	47	1, 158
Ohio	1, 962	194	3, 521	837	1, 462	746	867	54	713
Indiana	298	83	399	38	749	690	142	10	163
Illinois	1, 325	605	3, 306	1, 130	2, 224	656	941	28	765
Michigan	1, 091	284	8, 024	944	1, 417	303	509	14	590
Wisconsin	1, 227	57	2, 988	840	795	70	189	6	817
Minnesota	515	52	1, 137	--------	522	18	210	8	207
Iowa	295	30	1, 847	150	331	469	38	2	72
Missouri	415	138	756	298	653	436	230	24	181
North Dakota	52	20	103	202	118	83	25	3	46
South Dakota	127	16	488	41	84	299	14	1	99
Nebraska	215	71	1, 916	113	350	0	30	1	131
Kansas	466	32	3, 386	617	512	398	147	10	343
Delaware	35	10	59	2	38	0	[1] 14	2	17
Maryland	861	76	257	132	548	0	243	13	150
District of Columbia	111	51	86	132	90	0	96	1	28
Virginia	785	81	3, 757	--------	172	48	174	28	1, 177
West Virginia	209	42	506	--------	158	142	42	45	233
North Carolina	1, 067	118	175	--------	164	86	--------	15	1, 342
South Carolina	338	97	203	193	22	14	165	31	553
Georgia	163	30	905	251	86	5	73	18	199
Florida	396	30	1, 957	699	32	0	45	9	70
Kentucky [2]	--------	--------	--------	--------	--------	--------	--------	--------	--------
Tennessee	150	30	1, 141	102	264	48	150	44	148
Alabama	254	53	691	69	47	27	350	13	209
Mississippi	984	42	789	998	47	123	333	68	1, 709
Arkansas	118	19	345	92	41	39	[1] 34	26	189
Louisiana	158	105	443	16	82	50	[1] 149	58	38
Oklahoma [3]	68	34	1, 153	15	108	427	35	18	124
Texas [2]	--------	--------	--------	--------	--------	--------	--------	--------	--------
Montana	50	13	90	262	152	58	21	6	36
Idaho	40	4	310	70	33	26	8	5	21
Wyoming	38	4	179	77	16	34	--------	0	14
Colorado [4]	--------	--------	--------	--------	--------	--------	--------	--------	--------
New Mexico	175	34	280	288	54	27	54	10	11
Arizona	81	19	268	183	61	94	150	9	37
Nevada	8	--------	38	19	--------	36	7	0	19
Washington	464	33	2, 081	513	156	362	160	8	510
Oregon	156	25	402	192	109	101	87	12	208
California	2, 739	276	11, 707	4, 128	780	497	1, 149	60	1, 200

[1] Pulmonary.
[2] Reports received weekly.
[3] Exclusive of Oklahoma City and Tulsa.
[4] Report not received at time of going to press.

Case Rates per 1,000 Population (Annual Basis) for the Month of April, 1930

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	2.76	0.05	3.03	4.89	2.31	0.00	1.26	0.15	1.72
New Hampshire	-------	.13	-------	-------	2.05	-------	-------	.05	-------
Vermont	2.93	.14	13.15	1.00	1.55	.62	.45	.07	.62
Massachusetts	2.38	.79	15.95	2.24	3.35	.00	1.62	.06	3.65
Rhode Island	1.17	.59	.35	.02	2.33	.00	.95	.02	2.09
Connecticut	3.23	.40	1.21	1.03	2.96	.00	1.20	.04	1.27
New York	2.74	.60	7.91	3.12	2.44	.04	1.99	.07	1.65
New Jersey	2.94	1.42	18.00	-------	3.16	.00	1.59	.04	1.32
Pennsylvania	3.31	.62	7.72	2.26	2.50	.01	.86	.03	1.39
Ohio	3.38	.33	6.07	1.44	2.52	1.29	1.49	.09	1.23
Indiana	1.12	.31	1.50	.14	2.82	2.60	.54	.04	.61
Illinois	2.12	.97	5.30	1.81	3.56	1.05	1.51	.04	1.23
Michigan	2.77	.72	20.36	2.40	3.60	.77	1.29	.04	1.50
Wisconsin	4.94	.23	12.03	3.38	3.20	.28	.76	.02	3.29
Minnesota	2.24	.23	4.95	-------	2.27	.08	.91	.03	.90
Iowa	1.47	.15	9.23	.75	1.65	2.34	.19	.01	.36
Missouri	1.42	.47	2.59	1.02	2.24	1.49	.79	.08	.62
North Dakota	.99	.38	1.95	3.83	2.24	1.57	.47	.06	.87
South Dakota	2.15	.27	8.25	.69	1.42	5.05	.24	.02	1.67
Nebraska	1.83	.60	16.28	.96	2.97	.00	.25	.01	1.11
Kansas	3.07	.21	22.28	1.06	3.37	2.62	.97	.07	2.26
Delaware	1.73	.49	2.92	.10	1.88	.00	[1].69	.10	.84
Maryland	6.33	.56	1.89	.97	4.03	.00	1.79	.10	1.10
District of Columbia	2.32	1.07	1.80	2.76	1.88	.00	2.01	.02	.59
Virginia	3.63	.37	17.36	-------	.79	.22	.80	.13	5.44
West Virginia	1.43	.29	3.46	-------	1.08	.97	.29	.31	1.59
North Carolina	4.30	.48	.71	-------	.66	.35	-------	.06	5.41
South Carolina	2.16	.62	1.30	1.23	.14	.09	1.06	.20	3.54
Georgia	.61	.11	3.37	.93	.32	.02	.27	.07	.74
Florida	3.20	.24	15.80	5.64	.26	.00	.36	.07	.57
Kentucky [2]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Tennessee	.72	.14	5.47	.49	1.27	.23	.72	.21	.71
Alabama	1.18	.25	3.21	.32	.22	.13	1.62	.06	.97
Mississippi	6.69	.29	5.36	6.78	.32	.84	2.26	.46	11.61
Arkansas	.72	.12	2.11	.56	.25	.24	[1].21	.16	1.16
Louisiana	.97	.64	2.72	.10	.50	.31	[1].91	.36	.23
Oklahoma [3]	.38	.19	6.36	.08	.60	2.36	.19	.10	.68
Texas [2]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Montana	1.11	.29	1.99	5.81	3.37	1.29	.47	.13	.80
Idaho	.85	.09	6.62	1.49	.70	.55	.17	.11	.45
Wyoming	1.79	.19	8.41	3.62	.75	1.60	-------	.00	.66
Colorado [4]	-------	-------	-------	-------	-------	-------	-------	-------	-------
New Mexico	5.27	1.02	8.43	8.67	1.63	.81	1.63	.30	.33
Arizona	1.96	.46	6.47	4.42	1.47	2.27	3.62	.22	.89
Nevada	.13	-------	.60	.30	-------	.57	.11	.00	.30
Washington	3.45	.25	15.47	3.81	1.16	2.69	1.19	.06	3.79
Oregon	2.05	.33	5.28	2.52	1.43	1.33	1.14	.16	2.73
California	6.94	.70	29.67	10.46	1.98	1.26	2.91	.15	3.04

[1] Pulmonary.
[2] Reports received weekly.
[3] Exclusive of Oklahoma City and Tulsa.
[4] Report not received at time of going to press.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,370,000. The estimated population of the 89 cities reporting deaths is more than 29,860,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended August 2, 1930, and August 3, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	560	910	
95 cities	239	399	440
Measles:			
45 States	1,513	1,376	
95 cities	415	292	
Meningococcus meningitis:			
46 States	98	147	
95 cities	40	68	
Poliomyelitis:			
47 States	224	65	
Scarlet fever:			
46 States	748	921	
95 cities	235	238	269
Smallpox:			
46 States	260	313	
95 cities	21	35	19
Typhoid fever:			
46 States	933	875	
95 cities	110	116	140
Deaths reported			
Influenza and pneumonia:			
89 cities	315	326	
Smallpox:			
89 cities	0	0	

City reports for week ended August 2, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	1	0	0		0	0	2	1
New Hampshire:								
Concord	0	0	0		0	0	0	0
Manchester	0	0	0		0	0	0	0
Nashua	0	0	0		0	2	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	0	0		0	2	0	0
Massachusetts:								
Boston	10	21	9	1	0	29	6	10
Fall River	0	2	2		0	3	1	3
Springfield	1	1	0		0	1	1	1
Worcester	2	2	1		0	9	0	0
Rhode Island:								
Pawtucket	0	0	0		0	0	0	1
Providence	1	3	2		0	2	1	0
Connecticut:								
Bridgeport	0	2	0		0	0	0	1
Hartford	0	2	1		0	0	0	0
New Haven	4	0	0		0	0	0	0

City reports for week ended August 2, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC								
New York:								
Buffalo	3	8	10	----------	0	2	3	9
New York	22	110	39	2	1	109	18	70
Rochester	3	2	3	----------	0	2	1	2
Syracuse	4	2	1	----------	0	9	1	0
New Jersey:								
Camden	1	3	1	----------	0	7	0	1
Newark	0	7	9	2	0	7	1	5
Trenton	1	1	0	----------	0	0	0	7
Pennsylvania:								
Philadelphia	6	30	2	----------	0	29	12	25
Pittsburgh	3	12	8	----------	0	26	2	9
Reading	1	1	1	----------	0	0	1	1
Scranton	1	2	0	----------	0	1	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	0	3	1	----------	0	7	1	4
Cleveland	23	17	4	----------	0	4	13	12
Columbus	6	2	1	1	1	4	0	1
Toledo	8	4	2	1	1	2	2	2
Indiana:								
Fort Wayne	----------	1	----------	----------	----------	----------	----------	----------
Indianapolis	3	2	0	----------	0	3	2	9
South Bend	1	0	2	----------	0	0	0	2
Terre Haute	0	0	0	----------	0	0	0	2
Illinois:								
Chicago	20	56	46	----------	1	4	31	25
Springfield	0	1	0	----------	0	2	0	0
Michigan:								
Detroit	8	25	19	1	0	15	8	11
Flint	3	2	0	----------	0	3	0	0
Grand Rapids	0	1	1	----------	0	1	0	1
Wisconsin:								
Kenosha	6	0	0	----------	0	1	0	0
Madison	1	0	0	----------	----------	0	0	----------
Milwaukee	12	7	3	----------	0	8	7	2
Racine	1	1	0	----------	0	2	0	0
Superior	0	1	0	----------	0	0	1	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0	----------	0	0	0	1
Minneapolis	4	9	4	----------	0	0	2	3
St. Paul	7	5	0	----------	0	1	0	2
Iowa:								
Davenport	0	0	1	----------	----------	0	0	----------
Des Moines	0	1	0	----------	----------	0	0	----------
Sioux City	----------	0	----------	----------	----------	----------	----------	----------
Waterloo	0	0	0	----------	----------	0	0	----------
Missouri:								
Kansas City	2	2	2	----------	0	2	0	4
St. Joseph	1	1	1	----------	0	0	0	1
St. Louis	4	15	7	----------	----------	13	4	----------
North Dakota:								
Fargo	0	0	0	----------	0	0	5	0
Grand Forks	0	0	0	----------	----------	0	0	----------
South Dakota:								
Aberdeen	0	0	0	----------	----------	2	0	----------
Sioux Falls	0	0	0	----------	----------	0	0	----------
Nebraska:								
Omaha	0	2	4	----------	0	2	2	3
Kansas:								
Topeka	3	0	0	1	0	0	5	1
Wichita	0	1	0	----------	0	2	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0	----------	0	0	0	0
Maryland:								
Baltimore	2	10	4	1	0	3	5	10
Cumberland	0	0	0	----------	0	1	0	0
Frederick	0	0	0	----------	0	0	0	0
District of Columbia:								
Washington	5	5	4	1	1	20	0	7
Virginia:								
Lynchburg	1	0	0	----------	0	1	2	0
Norfolk	0	0	0	----------	0	0	0	2
Richmond	0	2	5	----------	0	1	0	1
Roanoke	0	0	3	----------	0	0	0	0

City reports for week ended August 2, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—continued								
West Virginia:								
Charleston	0	0	0		0	0	0	2
Wheeling	1	1	1		0	0	1	1
North Carolina:								
Raleigh	0	1	0		0	0	0	0
Wilmington	0	0	0		0	0	0	0
Winston-Salem	0	1	2	2	0	0	1	0
South Carolina:								
Charleston	0	0	0		0	0	0	2
Columbia	0	0	0		0	0	1	4
Georgia:								
Atlanta	0	2	0		1	2	0	4
Brunswick	0	0	0		0	0	1	0
Savannah	0	1	0	2	0	1	1	1
Florida:								
Miami	0	1	0		0	0	1	0
St. Petersburg		0			0			0
Tampa	0	0	1		1	1	0	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	0	0	0
Tennessee:								
Memphis	0	2	0		0	0	0	3
Nashville	0	2	0		0	4	0	2
Alabama:								
Birmingham	0	1	0	1	0	2	0	2
Mobile	0	0	1		0	0	0	1
Montgomery	0	0	0			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0			0	0	
Little Rock	0	0	0		0	0	0	0
Louisiana:								
New Orleans	0	5	4	1	0	2	0	9
Shreveport	0	0	0		0	0	1	0
Oklahoma:								
Tulsa	0	0	0		0	0	0	
Texas:								
Dallas	0	3	4		0	1	0	0
Fort Worth	0	1	0		0	0	0	2
Galveston	0	0	0		0	0	0	2
Houston	0	2	2		0	0	0	3
San Antonio	0	1	0		0	0	1	7
MOUNTAIN								
Montana:								
Billings	0	0	0		0	0	0	0
Great Falls	0	0	0		0	2	0	0
Helena	1	0	1		0	0	0	0
Missoula	1	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	2	0	1
Colorado:								
Denver	1	6	3		0	6	0	4
Pueblo	0	0	0		0	5	2	1
New Mexico:								
Albuquerque	1	0	1		0	0	0	0
Arizona:								
Phoenix	0	0	0		0	0	0	1
Utah:								
Salt Lake City	6	2	0		0	3	2	1
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	6	1	1			11	12	
Spokane	5	1	0			5	0	
Tacoma	0	2	4		0	6	1	1
Oregon:								
Portland	3	5	0		0	5	2	1
Salem	0	0	1		0	0	0	0
California:								
Los Angeles	3	25	15	4	0	24	13	10
Sacramento	0	2	0	1	1	3	3	1
San Francisco		8						

City reports for week ended August 2, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	1	0	0	0	0	0	0	1	1	12	17
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	11
Manchester	0	0	0	0	0	0	0	0	0	0	6
Nashua	0	0	0	0	0	0	0	0	0	0	-------
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	0	2
Burlington	0	0	0	0	0	0	0	0	0	0	9
Massachusetts:											
Boston	17	18	0	0	0	8	2	1	0	47	162
Fall River	1	0	0	0	0	2	0	0	0	1	20
Springfield	1	1	0	0	0	0	0	0	0	6	27
Worcester	2	3	0	0	0	1	0	0	0	1	36
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	14
Providence	2	2	0	0	0	3	1	0	0	8	46
Connecticut:											
Bridgeport	2	0	0	0	0	0	0	0	0	0	20
Hartford	2	1	0	0	0	0	1	0	0	2	30
New Haven	0	0	0	0	0	2	1	1	0	5	32
MIDDLE ATLANTIC											
New York:											
Buffalo	6	4	0	0	0	8	1	0	0	18	120
New York	33	19	0	0	0	86	27	7	0	128	1,205
Rochester	2	2	0	0	0	1	1	0	0	10	61
Syracuse	2	1	0	0	0	1	0	0	0	50	46
New Jersey:											
Camden	1	2	0	0	0	2	1	1	0	0	32
Newark	4	4	0	0	0	16	1	1	0	11	88
Trenton	0	1	0	0	0	3	1	0	0	35	57
Pennsylvania:											
Philadelphia	17	9	0	0	0	26	6	1	0	24	494
Pittsburgh	8	5	0	0	0	6	2	0	0	21	162
Reading	0	0	0	0	0	0	0	0	0	9	15
Scranton	0	0	0	0	0	0	0	0	0	10	-------
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	5	1	0	0	11	2	0	1	13	144
Cleveland	10	8	0	0	0	12	3	1	0	53	148
Columbus	2	1	0	0	0	5	1	3	1	7	85
Toledo	2	3	1	0	0	8	2	0	0	2	67
Indiana:											
Fort Wayne	0	-------	1	-------	-------	-------	0	-------	-------	-------	-------
Indianapolis	2	4	1	0	0	10	1	2	0	13	91
South Bend	1	1	0	0	0	0	0	0	0	1	17
Terre Haute	0	0	0	0	0	0	0	1	0	0	25
Illinois:											
Chicago	31	35	0	0	0	45	5	5	1	85	631
Springfield	1	0	0	0	0	0	0	0	0	0	21
Michigan:											
Detroit	24	18	0	2	0	36	5	6	1	112	281
Flint	4	1	1	0	0	3	0	0	0	7	27
Grand Rapids	2	3	0	0	0	0	0	0	0	8	27
Wisconsin:											
Kenosha	0	0	1	1	0	0	0	0	0	10	2
Madison	1	4	0	0	-------	-------	0	0	-------	2	-------
Milwaukee	6	1	1	0	0	2	1	1	0	88	99
Racine	1	2	0	0	0	2	0	0	0	26	9
Superior	2	0	1	0	0	0	0	0	0	0	9

City reports for week ended August 2, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	1	1	0	0	0	0	0	0	4	12
Minneapolis	12	6	0	0	0	2	0	1	1	2	89
St. Paul	6	1	1	0	0	3	1	1	0	10	43
Iowa:											
Davenport	0	0	0	7	-------	-------	0	0	-------	0	-------
Des Moines	2	1	0	7	-------	-------	0	0	-------	0	33
Sioux City	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Waterloo	0	1	0	1	-------	-------	0	0	-------	5	-------
Missouri:											
Kansas City	2	6	0	1	0	7	3	2	0	18	114
St. Joseph	0	0	0	0	0	0	0	0	0	2	29
St. Louis	7	8	0	2	0	8	5	3	0	11	224
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	8	-------
Grand Forks	0	1	1	1	-------	-------	0	0	-------	0	-------
South Dakota:											
Aberdeen	0	0	0	2	-------	-------	0	0	-------	3	-------
Sioux Falls	1	0	0	0	-------	-------	0	0	-------	0	9
Nebraska:											
Omaha	1	1	0	1	0	3	0	5	0	2	68
Kansas:											
Topeka	1	1	-------	0	0	0	1	0	0	15	16
Wichita	1	0	1	1	0	0	1	0	1	0	22
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	0	0	0	0	1	0	3	3	2	21
Maryland:											
Baltimore	5	4	0	0	0	15	8	4	0	38	245
Cumberland	0	0	0	0	0	0	0	2	0	0	9
Frederick	0	0	0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	4	2	0	0	0	7	3	6	1	6	146
Virginia:											
Lynchburg	0	0	0	0	0	0	1	0	0	1	13
Norfolk	0	2	0	0	0	2	1	0	0	1	-------
Richmond	2	5	0	2	0	4	1	0	0	2	45
Roanoke	1	0	1	0	0	2	0	0	0	3	21
West Virginia:											
Charleston	0	0	0	0	0	2	1	2	0	6	24
Wheeling	1	0	0	0	0	0	0	[1] 2	0	0	18
North Carolina:											
Raleigh	0	1	0	0	0	0	1	0	0	2	10
Wilmington	0	1	0	0	0	0	0	0	0	8	-------
Winston-Salem	1	1	0	0	0	0	1	0	0	5	18
South Carolina:											
Charleston	0	0	0	0	0	4	1	1	1	3	35
Columbia	0	0	0	0	0	0	1	0	0	2	9
Georgia:											
Atlanta	2	7	0	0	0	5	3	1	0	3	59
Brunswick	0	0	0	0	0	1	0	1	0	0	2
Savannah	0	0	0	0	0	4	1	3	0	0	27
Florida:											
Miami	0	0	0	0	0	3	0	0	0	0	24
St. Petersburg	0	-------	0	-------	0	0	0	-------	0	-------	7
Tampa	0	1	0	0	0	1	0	1	0	1	15

[1] Nonresidents.

City reports for week ended August 2, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	0	0	0	0	0	0	1	0	0	19
Tennessee:											
Memphis	0	0	0	0	0	7	8	10	1	0	100
Nashville	0	1	0	0	0	5	6	3	0	0	55
Alabama:											
Birmingham	2	0	0	0	0	4	5	4	1	0	69
Mobile	0	0	0	0	0	3	1	0	0	0	17
Montgomery	0	0	0	0	-------	-------	2	0	-------	1	-------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	1	0	0	-------	-------	0	1	-------	3	-------
Little Rock	0	0	0	0	0	1	1	0	0	0	-------
Louisiana:											
New Orleans	3	7	0	0	0	13	5	7	0	1	123
Shreveport	0	0	0	0	0	4	2	0	2	0	42
Oklahoma:											
Tulsa	0	1	0	0	-------	-------	2	3	-------	2	-------
Texas:											
Dallas	2	4	1	0	0	3	3	1	1	1	71
Fort Worth	1	0	0	0	0	3	2	0	0	0	33
Galveston	0	0	0	0	0	1	0	0	0	0	17
Houston	1	2	0	2	0	4	2	3	1	0	45
San Antonio	0	1	0	2	0	5	1	0	0	0	55
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	7
Great Falls	0	2	0	0	0	0	0	0	0	2	14
Helena	0	0	0	0	0	1	0	0	0	5	2
Missoula	0	0	0	0	0	0	0	0	0	0	11
Idaho:											
Boise	0	0	0	0	0	1	0	0	0	0	8
Colorado:											
Denver	3	3	0	0	0	9	1	1	0	34	72
Pueblo	0	1	0	0	0	0	0	1	0	0	9
New Mexico:											
Albuquerque	0	0	0	0	0	3	0	2	0	0	7
Arizona:											
Phoenix	0	0	0	0	0	1	0	0	1	0	9
Utah:											
Salt Lake City	1	0	1	0	0	3	1	1	0	32	28
Nevada:											
Reno	0	1	0	0	0	0	0	0	0	1	2
PACIFIC											
Washington:											
Seattle	2	3	1	0	-------	-------	1	1	-------	15	-------
Spokane	1	0	1	2	-------	-------	0	0	-------	2	-------
Tacoma	1	6	1	3	0	1	1	0	0	6	26
Oregon:											
Portland	2	1	4	1	0	3	0	2	0	6	57
Salem	0	0	0	0	0	0	0	0	0	6	-------
California:											
Los Angeles	10	4	3	1	0	22	3	5	1	27	235
Sacramento	1	1	0	0	0	0	1	1	0	2	29
San Francisco	5	-------	1	-------	-------	-------	2	-------	-------	-------	-------

City reports for week ended August 2, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	0	0	1	0	0	0	1	8	0
Worcester	0	1	0	0	0	0	1	0	0
Connecticut:									
Providence	0	0	1	0	0	0	1	1	0
Bridgeport	1	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York	8	3	1	4	0	0	13	0	0
Rochester	0	0	0	0	0	0	0	1	0
Syracuse	0	0	0	0	0	0	1	7	0
New Jersey:									
Newark	2	0	1	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	4	2	1	0	1	0	0	3	0
Pittsburgh	0	1	0	0	0	0	0	2	1
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	0	0	0
Cleveland	0	0	0	0	0	0	0	1	0
Columbus	0	0	1	1	0	0	0	0	0
Indiana:									
Indianapolis	1	1	0	0	0	0	0	0	0
Terre Haute	0	1	0	0	0	0	0	0	0
Illinois:									
Chicago	4	0	1	0	1	0	2	0	0
Michigan:									
Detroit	2	2	0	0	1	0	1	0	0
Flint	1	0	0	0	0	0	0	0	0
Wisconsin:									
Milwaukee	2	0	0	0	0	0	1	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	0	0	0	0	0	0	0	0
St. Paul	1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	4	1	0	0	0	0	0	2	0
St. Louis	1	0	1	0	0	0	1	1	0
South Dakota:									
Aberdeen	1	0	0	0	0	0	0	0	0
Kansas:									
Wichita	0	0	0	0	0	0	0	4	1
SOUTH ATLANTIC [1]									
Delaware:									
Wilmington	0	0	0	0	0	0	0	1	0
Maryland:									
Baltimore	0	0	1	1	0	0	0	1	0
District of Columbia:									
Washington [1]	0	0	0	0	1	1	0	0	0
Virginia:									
Norfolk	3	0	0	0	0	0	0	2	0
Richmond	0	1	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	4	0	0	0	0
Winston-Salem	0	0	0	0	20	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	2	0	0	0	0
Georgia:									
Atlanta	0	0	0	0	2	2	0	1	0
Savannah [1]	0	0	1	0	1	2	0	0	0

[1] Typhus fever, 9 cases and 1 death: 2 cases and 1 death at Washington, D. C., 4 cases at Savannah, Ga., 1 case at Tampa, Fla., 1 case at Mobile, Ala., and 1 case at Houston, Tex.

City reports for week ended August 2, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	2	2	0	0	0	0	0	0	0
Nashville	0	2	0	0	0	0	0	0	0
Alabama:[1]									
Birmingham	0	0	0	0	2	0	0	2	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	3	3	0	0	2	2	0	3	0
Shreveport	0	0	0	0	0	3	0	1	0
Texas:									
Dallas	0	0	0	0	2	1	0	0	0
Fort Worth	0	0	0	0	0	2	0	0	0
Galveston	0	0	0	0	0	1	0	1	0
Houston[1]	0	0	0	0	0	1	0	2	0
San Antonio	0	0	0	0	0	0	0	2	0
MOUNTAIN									
Colorado:									
Pueblo	0	0	0	1	0	0	0	0	0
PACIFIC									
Washington:									
Spokane	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	2	0	0	0	3	0	1	22	2

[1] Typhus fever, 9 cases and 1 death: 2 cases and 1 death at Washington, D. C., 4 cases at Savannah, Ga, 1 case at Tampa, Fla., 1 case at Mobile, Ala., and 1 case at Houston, Tex.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended August 2, 1930, compared with those for a like period ended August 3, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, June 29 to August 2, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929
98 cities	59	89	59	88	[2] 49	73	[3] 39	68	[4] 40	67
New England	51	70	38	79	33	83	22	58	33	54
Middle Atlantic	59	101	52	99	48	76	35	75	35	67
East North Central	91	128	87	119	66	105	[5] 50	103	[6] 49	99
West North Central	36	77	66	69	38	54	[7] 38	21	[8] 35	25
South Atlantic	24	34	29	43	[9] 43	30	[10] 39	28	37	47
East South Central	40	27	27	41	13	27	27	27	7	34
West South Central	52	72	64	84	[11] 38	69	34	99	37	95
Mountain	9	26	26	26	69	17	69	9	34	9
Pacific	38	43	61	41	38	41	33	31	[12] 65	46

MEASLES CASE RATES

	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929
98 cities	276	195	257	150	[2] 151	98	[3] 110	69	[4] 69	49
New England	498	209	421	186	235	146	175	101	97	97
Middle Atlantic	339	76	322	51	205	47	152	27	91	35
East North Central	170	474	155	351	71	210	[5] 60	149	[6] 34	84
West North Central	137	114	127	104	57	52	[7] 73	58	[8] 39	38
South Atlantic	165	73	130	49	[9] 114	43	[10] 52	17	55	11
East South Central	142	27	202	14	47	7	61	7	40	7
West South Central	26	69	19	61	[11] 11	4	7	27	11	8
Mountain	712	148	566	104	240	61	172	70	154	26
Pacific	527	138	562	152	301	109	191	77	[12] 159	43

SCARLET FEVER CASE RATES

	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929
98 cities	77	88	72	83	[2] 54	64	[3] 50	59	[4] 39	40
New England	66	90	66	83	60	56	66	56	55	63
Middle Atlantic	57	46	51	41	37	35	36	19	22	24
East North Central	116	173	115	160	87	103	[5] 77	110	[6] 50	62
West North Central	102	38	83	79	42	54	[7] 31	77	[8] 49	35
South Atlantic	57	60	62	64	[9] 45	69	[10] 37	60	40	28
East South Central	13	55	47	48	20	55	54	27	7	34
West South Central	49	23	37	42	[11] 23	72	49	57	56	38
Mountain	163	44	86	35	77	78	26	26	60	9
Pacific	45	135	50	89	57	65	45	65	[12] 46	48

SMALLPOX CASE RATES

	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929
98 cities	7	15	7	8	[2] 6	13	[3] 7	8	[4] 3	7
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	5	41	9	19	10	32	[5] 8	16	[6] 2	13
West North Central	13	13	9	15	13	21	[7] 22	21	[8] 12	6
South Atlantic	2	2	0	2	[9] 4	2	[10] 2	0	4	0
East South Central	20	21	20	7	0	7	20	7	0	7
West South Central	0	11	7	15	[11] 8	0	4	8	15	4
Mountain	51	35	9	35	17	44	17	9	0	26
Pacific	38	24	43	10	21	34	26	22	[12] 20	34

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1930, and 1929, respectively.
[2] Columbia, S. C., and Fort Smith, Ark., not included.
[3] South Bend, Ind., Kansas City, Mo., Columbia, S. C., and Atlanta, Ga., not included.
[4] Fort Wayne, Ind., Sioux City, Iowa, and San Francisco, Calif., not included.
[5] South Bend, Ind., not included.
[6] Fort Wayne, Ind., not included.
[7] Kansas City, Mo., not included.
[8] Sioux City, Iowa, not included.
[9] Columbia, S. C., not included.
[10] Columbia, S. C., and Atlanta, Ga., not included.
[11] Fort Smith, Ark., not included.
[12] San Francisco, Calif., not included.

Summary of weekly reports from cities, June 29 to August 2, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929
98 cities	10	10	16	14	[2] 15	18	[3] 18	18	[4] 18	19
New England	7	4	4	4	9	9	7	29	7	11
Middle Atlantic	6	6	10	7	4	10	7	7	5	11
East North Central	1	4	6	7	9	8	[5] 13	8	[6] 12	10
West North Central	8	13	9	10	23	19	[7] 56	13	[8] 23	33
South Atlantic	26	32	55	7	[9] 37	32	[10] 35	37	48	22
East South Central	94	48	94	157	67	144	74	103	121	150
West South Central	49	8	37	84	[11] 61	57	41	69	45	53
Mountain	0	17	0	9	26	52	17	44	26	9
Pacific	5	7	17	2	19	5	12	7	[12] 23	19

INFLUENZA DEATH RATES

	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929
91 cities	4	2	4	3	[9] 3	3	[3] 3	3	[13] 1	3
New England	2	0	0	2	0	0	0	2	0	0
Middle Atlantic	4	3	4	2	3	2	1	2	0	2
East North Central	2	1	3	3	2	3	[5] 3	4	[6] 1	4
West North Central	0	0	6	0	0	3	[7] 4	3	0	0
South Atlantic	5	2	2	4	[9] 0	6	[10] 4	4	5	4
East South Central	7	15	15	7	0	0	0	0	0	15
West South Central	15	4	8	4	11	20	11	4	0	8
Mountain	0	0	0	26	9	0	0	9	0	9
Pacific	9	0	3	0	6	3	3	0	[12] 5	0

PNEUMONIA DEATH RATES

	July 5, 1930	July 6, 1929	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929
91 cities	55	63	54	55	[9] 44	55	[3] 56	49	[13] 54	54
New England	29	49	40	29	35	70	40	31	38	43
Middle Atlantic	58	67	57	62	56	65	72	57	62	61
East North Central	41	56	38	50	32	40	[5] 37	38	[6] 41	47
West North Central	62	63	74	51	38	36	[7] 42	51	47	39
South Atlantic	55	69	55	58	[9] 47	54	[10] 76	60	60	51
East South Central	162	75	81	30	59	52	103	52	59	75
West South Central	84	109	84	82	50	27	77	86	61	78
Mountain	60	61	103	44	51	96	77	61	60	61
Pacific	64	31	61	53	18	63	9	25	[12] 57	50

[2] Columbia, S. C., and Fort Smith, Ark., not included.
[3] South Bend, Ind., Kansas City, Mo., Columbia, S. C., and Atlanta, Ga., not included.
[4] Fort Wayne, Ind., Sioux City, Iowa, and San Francisco, Calif., not included.
[5] South Bend, Ind., not included.
[6] Fort Wayne, Ind., not included.
[7] Kansas City, Mo., not included.
[8] Sioux City, Iowa, not included.
[9] Columbia, S. C., not included.
[10] Columbia, S. C., and Atlanta, Ga., not included.
[11] Fort Smith, Ark., not included.
[12] San Francisco, Calif., not included.
[13] Fort Wayne, Ind., and San Francisco, Calif., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended August 2, 1930.—The Bureau of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended August 2, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		1			
New Brunswick					1
Quebec	1				28
Ontario	3	3	8	8	10
Manitoba [1]					
Saskatchewan [1]					
Alberta			2	1	
British Columbia			2	1	5
Total	4	4	12	10	44

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended August 2, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended August 2, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Puerperal septicemia	1
Chicken pox	10	Scarlet fever	31
Diphtheria	19	Tuberculosis	63
Influenza	1	Typhoid fever	28
Measles	6	Whooping cough	26
Mumps	3		

CUBA

Habana—Communicable diseases—July, 1930.—During the month of July, 1930, certain communicable diseases were reported in the city of Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	3		Paratyphoid fever	1	1
Diphtheria	8		Scarlet fever	10	
Leprosy	1		Tuberculosis	44	8
Malaria	19		Typhoid fever	20	2
Measles	1				

FRANCE

Alsace-Lorraine—Poliomyelitis.—A report dated July 24, 1930, states that poliomyelitis was prevalent in the Department of Bas-Rhin, Alsace-Lorraine. The disease first appeared during the latter part of June. During the 10 days ended June 30, 1930, 23 cases were reported, and from July 1 to 23, 280 cases were reported in the Department of Bas-Rhin and in the city of Strasbourg. Out of 561 communes only 53 were reported to be affected, the average being about 1 case per 1,000 inhabitants.

Fourteen cases were reported in the Department of Haut-Rhin and 27 in the Moselle. These latter cases were centralized for the most part in and about Metz.

ITALY

Communicable diseases—Four weeks ended April 13, 1930.—During the four weeks ended April 13, 1930, certain communicable diseases were reported in Italy as follows:

Disease	Mar. 17-23		Mar. 24-30		Mar. 31-Apr. 6		Apr. 7-13	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	17	14	7	7	8	8	10	8
Cerebrospinal meningitis	14	12	11	8	13	13	11	10
Chicken pox	471	146	417	125	334	131	463	141
Diphtheria and croup	599	318	648	337	454	268	516	294
Dysentery	3	3	3	1	3	3	3	2
Lethargic encephalitis	3	3	3	3	1	1	3	3
Measles	3, 269	399	3, 631	429	3, 033	439	3, 580	455
Poliomyelitis	4	4	5	5	2	2	3	3
Scarlet fever	357	126	396	146	270	109	328	136
Typhoid fever	217	139	219	138	201	134	242	148

JAMAICA

Communicable diseases—Four weeks ended July 19, 1930.—During the four weeks ended July 19, 1930, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the Island of Jamaica outside of Kingston, as follows:

Disease	Cases		Disease	Cases	
	Kingston	Other localities		Kingston	Other localities
Cerebrospinal meningitis	1	2	Poliomyelitis	1	
Chicken pox	1	9	Puerperal fever		5
Erysipelas		1	Tuberculosis	33	70
Leprosy		2	Typhoid fever	20	71
Lethargic encephalitis		1			

PANAMA CANAL ZONE

Communicable diseases—June, 1930.—During the month of June, 1930, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	28		Mumps	1	
Diphtheria	7		Pneumonia		24
Dysentery (amebic)		1	Tuberculosis		29
Dysentery (bacillary)	1	1	Typhoid fever	2	
Malaria	427	1	Whooping cough	12	
Measles	18				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930				June, 1930				July, 1930				August, 1930	
					10	17	24	31	7	14	21	28	5	12	19	26	2	9
Afghanistan	C													[1] P				
China:																		
Canton	C					1	1	1		2				2	1			
Manchuria—Dairen	C	1																
Swatow	C							3	4	3								
India	C	5,914	10,817	41,462	15,596	14,600	12,468	13,647	10,088	10,103								
	D	3,371	5,866	27,906	12,782	11,882	9,756	10,458	7,802	7,110								
Bassein	C			7	3	4												
	D			5	3	2												
Bombay	C		4															
Calcutta	C	269	354	647	194	175	142	98	78	73	94	77	81	53	49	37		
	D	153	220	414	125	107	83	57	44	36	36	63	54	28	23	23		
Negapatam	C									1								
	D									1								
Rangoon	C	3	2	1		5	2	2	1	1	2	2	1					
	D	1	2	1		1		2	1	1	1	1	1					
India (French):																		
Chandernagor	C	4	1	6	2	2	2				1	2						
	D	2	3	5	1	4	1				1	1						
Karikal	C	4	12	1								3						
	D	1	9	1								3						
Indo-China (see also table below):																		
Pnompenh	C	9		2	1				5	10	11	14	9	16	7			
	D	7	6			2	2	1	1	4	7	6	6	9	5	2		
Saigon and Cholon	C	5	14	76	59	40	48	13	17	19	7	5	7	1	1	1		
	D	4	6	55	43	27	24	7	11	10	2		3					

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930 10	May 17	May 24	May 31	June, 1930 7	June 14	June 21	June 28	July, 1930 5	July 12	July 19	July 26	August, 1930 2	August 9
Philippine Islands:[3]																		
Ports—																		
Cebu	C											1	20	13	13	9	5	4
	D												9	7	12	8	4	1
Iloilo	C													1	11	17	9	19
	D														9	13	10	18
Manila	C							1										1
Provinces—																		
Antique	C																14	4
	D																7	4
Bohol	C																	45
	D																	28
Bulacan	C								1			2				3		
	D								1									
Capiz	C															3	1	
	D															2	1	
Cebu	C								4	21	92	132	241	205	121	57	63	37
	D								4	10	42	65	45	78	61	35	37	27
Iloilo	C											1	1	3	75	66	250	227
	D												1	3	54	49	146	164
La Union	C													1				
Leyte	C										1	15	20					
	D											11	9					
Masbate	C											10	20	25	8	20	37	27
	D											3	4	15	2	4	18	11
Misami	C													2				
	D													2				
Negros, Occidental	C							10	3	11	19	11	7	90	193	165	178	99
	D							7	3	4	18	4	9	48	134	104	118	72
Negros, Oriental	C															17	9	2
	D														1	9	3	3
Nueva Ecija	C															1		
	D															1		
Pampanga	C										1	1	2					

Pangasinan	C												2		1			
Rizal	C								1									
	D								1									
Samar	C																	5
	D																	5
Surigao	C																	15
	D																	9
Tarlac	C																2	
Siam	C	7	1	29	12	4	13	4	8	10	6							
	D	4		13	10	2	7	2	3	9	4							
Bangkok	C	2	2	15			6	3	5	3	3	1		3	4	1	1	
	D		1	4			2	1		3		2		1	1	1	1	
Nagara Pathom	C	1		10														
	D	1		2														
Songkla	C													8		2		
	D													4		2		
On vessel:																		
S. S. at Suva, Fiji Islands	C	1																
S. S. Sutley, at Batavia, from Calcutta	C	1																
S. S. Sassari, at Massoua, from Jeddah	C							1										
	D							1										
On small boat at Port Cebu, from Bantayan Island	C								1									
	D								1									

Place		January, 1930	February, 1930	March, 1930			April, 1930			May, 1930			June, 1930	
				1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):														
Annam [1]	C	1	4		72				60		20	3	2	14
Cambodia [1]	C	147	90	49	32		18	6		5	31	52	56	88
Cochin-China [1]	C	177	65	5	22	55	48			188	224	259	147	126

[1] Reports incomplete.
[2] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9
Algeria:																			
Algiers	C														1	2			
Constantine	C									1				1					
Oran	C															2	1		
Argentina:																			
Andalgala.[1]																			
Rosario	C	P																	
Santa Fe	C	6																	
Villa Lia	D		2																
Azores: Ponta Delgada	C				8														
	D				5														
Belgian Congo	C													2					
	D													2					
Brazil:																			
Rio de Janeiro	C	1																	
	D	1																	
Sao Paulo.[2]																			
British East Africa (see also table below):																			
Tanganyika	C		7		44														
	D				20														
Uganda	C	82	47	98	117	54	89		84	121									
	D	70	43	87	105	48	75		72	75									
Canary Islands: Las Palmas	D																		1
Ceylon:																			
Colombo	C	4	3	4	1	4	1		1	1				1	2				
	D	4	3	4	1	3	1		1	1				1	2				
Plague-infected rats		1	3	2	4					1									
Chile: Antofagasta	C	1	1	1	1														
	D			2	1														
Dutch East Indies:																			
Batavia and West Java	C	167	153	124	87	18	33	17	14	19	27								
	D	164	150	122	81	18	33	17	14	19	27								
Plague-infected rats		3	3	3	8			3	2	3	1								

Celebes—Makassar	C	1																	
	D	1																	
Java and Madura	D	317	296	223	173	28	74	36	48	40									
Ecuador (see table below).																			
Egypt:																			
Alexandria	C	4	1	4	2	2	3	3	5	3	6	6	4	8	8	3	4	2	2
	D	1		1	2			1	2	2		2	5	2	3	2	3	2	1
Assiout	C				14	3	9	2	6	4	2	3		1	1				
	D				5		3	1	1		1		2	1	1				
Beheira	C	2		4															
Beni-Suef	C			4															
Dakahlieh	C		8	5	5	3	1	2	5	1									
	D			1			1	1											
Gharbieh	C	1			1														
	D				1														
Girga	C				1										1				
Minieh	C							6	1	1	1	4	4	2	1				
	D								1		1								
Port Said	C				1		1	1		1			1				1	1	
France: St. Ouen	C															1			
	D															1			
Greece (see also table below):																			
Patras	C			1								1				1			
Piraeus	C	1																	
Pyrgos	C			1															
Hawaii Territory, Hamaqua, Hawaii: Plague-infected rats												1							
India	C	4,814	5,639	4,087	2,215	281	188	117	62	55	59								
	D	3,308	3,940	3,344	1,960	271	205	103	56	42	52								
Bassein	C	1		3															
	D	1		1															
Bombay	C	1	1	7	4	4	1		1	1		2					1		
	D	1	1	5	8	1	4					1	1				1		
Plague-infected rats		28	31	86	108	23	39		19	6	7	8	5	13	14	10	15		
Madras Presidency	C	27	230	157	44	2		6	30	26	10	2			1				
	D	13	140	87	19		1	4	6	15	2				1				
Rangoon	C	3	7	3	5		1	3					1				2		
	D	2	6	3	4	1	1	1					1				2		
Plague-infected rats		1	7	3	4	1	3	1				1		2	2		2		
India (Portuguese)	D					7													
Indo-China (see also table below):																			
Pnompenh	C	1			3	1			2	6					1	1			
	D	2	13	13	4			1		5	1		1			1			
Saigon and Cholon	C	2		1		1				1		1							
	D	2		1								1							
Iraq: Baghdad	C	6	6	7	6	7	11	7	12	12	4	8	4	10	4	2	2	4	3
	D	2	1	4	2	3	5	4	6	7	3	5		5		1	1		2
Japan: Osaka (vicinity of)—Plague-infected rats		7	6	4	3														
Kwang-Chow-Wan	C	25	25	7	57		20		14	23		8							
Madagascar (see also table below): Tamatave	C				1					1									

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.
[2] 21 cases of plague with 8 deaths were reported Jan. 29, 1930, in the State of Sao Paulo, Brazil; 15 of these cases were in the city of Sao Paulo.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9
Morocco	C	4	48	55	121	19	22	18	12	2		1							
	D		13	18	45	11	14	6	3	4									
Nigeria: Lagos	C	6	7	13		1	1			1		3	1	1					
	D	6	7	5		1	1			1		3	1	1					
Plague-infected rats		44	42	25	7	2	6	5	4	1									
Senegal (see table below).																			
Siam	C	8	17	16	5		1	1	3										
	D	6	13	15	6		1		3										
Bangkok	C		1	5			1	1	3									1	
	D		1	4			1		3										
Nagara Pathom	C	7	5	1	10														
	D	7	6	1	9														
Nagara Rajsima	C	2	2	1	1													1	
	D			1	1														
Syria: Beirut	C										2	1	1		2	4	3		1
Tunisia:																			
Sfax district	C	18	22		1	17			4	6		3					6		
Tunis	C	6	5	1	4				1		1				1	4			
	D									1					1				
Union of Socialist Soviet Republics:																			
Salsk Region	C									1			1						
	D									1									
Stavropol Region	C									1									
	D									1									
Union of South Africa:																			
Cape Province	C	1	2	1		P				1									
	D		1	1															
Orange Free State	C	15	11	5	1														
	D	9	3	3															
Transvaal	C	8	2	1															
	D	3		1															
On vessel:																			
At Rio de Janeiro, Brazil, from Argentina	C	1																	

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
British East Africa (see also table above):							
Kenya	C	34	69	85	16	171	75
Uganda	C	184	109				
	D	155	90				
Ecuador: Guayaquil	C	4	2	2	0		
	D	2	2		0		
Plague-infected rats		4	2	2	0		
Ecuador (outside of Guayaquil)	C	4					
	D	2					
Greece (see also table above)	C				1		1
Indo-China (see also table above)	C	10	30	27	4		11
Madagascar (see also table above)	C	282					
	D	258					
Ambositra Province	C	128	49	25	14	1	
	D	111	41	20	12	1	
Antisirabe Province	C	26	22	38	46	19	
	D	25	22	36	45	19	
Itasy Province	C	31		4			
	D	31		4			
Miarinarivo Province	C		25	14	1	5	
	D		25	14	1	5	

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
Madagascar (see also table above)—Con.							
Moramanga Province	C	22	7	5	3	1	
	D	21	4	5	3		
Tamatave Province	C	3					
	D	1					
Tananarive Province	C	88	110	52	39	15	
	D	83	107	52	38	14	
Senegal:							
Baol [1]	C			18	24	13	2
	D			8	12	11	2
Dakar [1]	C				2	52	53
	D				2	42	117
Louga [1]	C		2		33	54	60
	D				10	27	21
Thies [1]	C	3		3	12	21	52
	D			2	9	8	35
Tivaouane [1]	C	1		11	71	135	43
	D			8	38	69	28

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	Aug. 2, 1930
Algeria:																	
Algiers	C	1	5	1		1		2									
Constantine	C																
Oran	C		1								1				1		
Arabia: Aden	C	2	3	1													
Bolivia: La Paz.[1]													1				
British Borneo: Sarawak	C	19															
British East Africa (see also table below):																	
Tanganyika	C	49	103	57	33	45	55	276	385	755							
	D	8	7	14	3	5	8	54	154	90							
British South Africa:																	
Northern Rhodesia	C		9	1			57	2									
	D			2			9										
Southern Rhodesia	C	6		66	53		42	60	75	1	3						
	D			1	4		8	1									
Canada:																	
Alberta	C	4	10	4										2	1	2	1
Edmonton	C	1	4	3													
British Columbia—Vancouver	C	16	20	17			2	2	1	1			2	2	1	1	1
Manitoba	C	2	4	4			7	3			4						
Ontario	C	86	100	77	14	24	24	20	14	10	13	10	3	5	6	10	8
North Bay	C	1			1												
Ottawa	C	11	19	21	3	10	7	5	6		8	1	1	1	4	7	5
Toronto	C						3	1	2	1	1			1			
Quebec	C											4	3				
Montreal	C																7
Saskatchewan	C	76	47	41	20	6	10	3		12	10			2	.	3	
Regina	C				1		3										
Ceylon:																	
Angoda, Western Province	C	10		6													
	D	1		2													
Colombo	C	3															
	D	2															
China:																	
Canton	C	11	6	3					1								
	D	3	2	3													

Chungking	C	P		P	P		P	P	P			P	P				
Foochow	C	P		P		P		P		P		P					
Hong Kong	C	62	38	18	5	5	2		2	1	1			2			
	D	51	25	23	4	2	3		1		1	1		1			
Manchuria—																	
Harbin	C			1		10	10										
Kwantung—Dairen	C	5		2	1		7			11	5		8				
	D						4				1						
Nanking	C	P	P	P	P			P	P	P				P	P		
Shanghai—																	
Foreigners only	C	2	2	3		1	1		1	1	1	2	1	1	1	1	[illegible]
Including natives	D	7	10	10		1	2	2	1		1	1					
Swatow	D	6	6	3	1		1	4	1		1	2	1				
Tientsin	C	1	2	2	1												
Chosen (see table below).																	
Colombia:																	
Barranquilla	C	102	2	1													
Buenaventura	C	1		15	2		1	1	1	1		4	4	3	2		
Costa Rica:																	
Port Limon	C			6				2	2								
San Jose [2]	C		10	7													
Curacao (alastrim)	C		14	2	2					1			2				
Dahomey (see table below).																	
Dutch East Inuies:																	
Borneo	C		185	90		10	4	2	2	10				2			
	D		12	31	1					1							
Java—																	
Batavia and West Java	C	14	78	64	1	1	5	5	1	4			3	1	3	1	
	D	7	6	11	1	1	3	2		1			2	1	1		
East Java and Madura	C			4											1		
Sanggi Islands	C	12	5	160	14	12											
	D		1	24	1	4											
Sumatra	C		48														
	D		5														
Egypt: Port Said	C			1		1								2			
Great Britain:																	
England and Wales	C	1,530	1,700	1,427	462	324	304	327	237	266	241	182	156	138	126	109	
Ashton under Lyne	C	29	15	18	6	3	4	4			3	4		4	2	2	
Bradford	C	2		3		1		1					1				
Cardiff	C		2	3									2				
Leeds	C	11	16	2									1				
London	C	699	710	602	222	138	148	129	130	136	125	107	84	52	62	48	
London and Great Towns	C	1,156	1,239	1,066	339	270	235	254	197	208	190	158	127	96	102	83	
	D	5	3	3													
Sheffield	C		8	2													
Stoke-on-Trent	C	41	122	85	19	9	13	21	3	10	15	4	3	2	1	3	
Scotland	C								1		3			1			
	D													1			

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26	Aug. 2, 1930
India	C	36,036	39,329	34,843	6,533	6,549	5,416	4,337	3,686	3,559							
	D	7,710	9,109	6,983	1,449	1,814	1,196	993	1,065	913							
Bombay	C	638	718	460	52	68	58	10	36	35	23	19	17	15	11	7	
	D	314	431	270	33	49	44	35	27	23	19	10	13	9	9	2	
Calcutta	C	399	361	495	109	70	52	71	46	45	45	25	27	19	13	14	
	D	287	305	403	94	72	40	52	50	37	29	30	17	17	12	10	
Cochin	C	184	291	183	13	8	7	9	4	1	10	1			4		
	D	29	35	13	5	1	2		2	1	1						
Karachi	C	38	33	30		6	7	1	5		1	1				1	
	D	16	47	17	2		1	1	2		1						
Madras	C	159	173	133	24	13	15	20	9	10	8	8	6	10	17	16	
	D	29	36	27	4	5	6		6	3	1		4	1	3	4	
Moulmein	C	143	146	43	27	29	20	13		9	6	6	4	10	3	1	
	D	40	41	7	4	6	5	6		3	3	1	3	4	1	2	
Negapatam	C	1					1			1		1			1		
Rangoon	C	7	10	4	2		3	1	1	5	1	2	2	1	1		
	D	2	5		1						1	1					
Tuticorin	C						5				1						
Vizagapatam	C	9	69	6	3	1	1			1							
	D	1	18	2		3											
India (French):																	
Chandernagor	C	11	6	10	6	2	8	8	4	8	5	2	3	1			
	D	5	2	2	2	4	1				2	1	1	1			
Karikal	C	12	24	19	6	5	1		4	3	1	3	1		1		
	D	8	7	8	2	1			2	2	1	3	1		1		
Pondicherry Province	C	52	21	24	9	13	10	8	4	4	9	6	4	9			
	D	40	13	20	7	12	10	7	4	4	9	6	3	9			
India (Portuguese)	C	50	38	44	2	27	5	13		3	18	7	1				
	D	5	2	8		3	1	4		2	2	6					
Indo-China (see also table below):																	
Pnompenh	C				1		1	1							1		
	D			2					1						1		
Saigon and Cholon	C	4	3	5	1	1		1	1								
	D	2	1	5		1		1									

Iraq:																	
Baghdad	C	3		8	1				1				1				
	D	1		1	1												
Basra	C	1		1													
Mossoul Liwa	C	12		22	13		8			1		3	47	20			
	D	2		3	2		1			1			19	1			
Ivory Coast (see table below).																	
Jamaica (alastrim)	C							2									
Japan: Tokyo	C			1													
	D			1													
Macao	D	2	3	2	1												
Mexico (see also table below):																	
Jalisco (State): Guadalajara	D	14	22	20			6	1	4		5	6	3	1			
Juarez	C	3	2								6						
	D	1									1						
Mexico City and surrounding territory [3]	C	38	106	99	30	15	17	18	17	23	20	17	10	12	4		
	D	21	31	47	6	12	8	6	5	4	3	5	2	3	1		
Morelos State.[4]																	
Progreso	C						1										
	D						1				1						
San Luis Potosi	C	1															
	D	1															
Morocco (see table below).																	
Nigeria (see also table below): Lagos	C	2	1	1								1					
Persia (see table below).																	
Philippine Islands: Sarangani and Balut Islands [5]	D	3															
Poland	C	2		7		1		2									
Portugal: Lisbon	C	7	7	8	6		2		1		2	7		7			
Rumania	C	1	2														
Siam	C	2		8	2												
	D			4													
Somaliland, British: Boales	C	19	2														
	D	2	6														
Spain	C									4		8		1	1		
Straits Settlements	C		5	5	1	3	2	5	5		1	3	1	2	7	1	1
	D		1	2		1	1	1	1		1		1	1	1		
Sudan (Anglo-Egyptian)	C	79	60	42		5	13	1	4	8	1	54	8	1		3	
	D	6	5	4			1	1				3		1			
Sudan (French) (see table below).																	
Switzerland: Berne Canton	C															1	
Syria (see table below).																	
Taiwan: Taihoku (see table below).																	
Tunisia: Tunis	C	3	3	4		1		1			2					1	
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P	P	P	P									
Orange Free State	C	P	P														
Transvaal	C	P	P														

[3] During the month of March, 1930, 100 cases of smallpox were reported in Mexico City, Mexico, and surrounding territory.
[4] Newspaper reports of Feb. 4 show an epidemic of smallpox in Ionacatepec, Morelos State, Mexico, and vicinity, giving 600 deaths in preceding 2 weeks.
[5] On Feb. 1, 1930, 317 cases of smallpox with 102 deaths were reported to that date in the Sarangani and Balut Islands.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930 10	May 17	May 24	May 31	June, 1930 7	June 14	June 21	June 28	July, 1930 5	July 12	July 19	July 26	Aug. 2, 1930
Upper Volta	C	26	2	3				1				5					
Zanzibar	C		13														
On vessel:																	
S. S. Tairoa, at Liverpool, from London	C	1															
S. S. Karagola, at Lourenco Marques, from India	C	1															
S. S. Elysia, at Port Sudan, from Bombay	C			1													
S. S. Naldera, at Port Said	C				1												
S. S. Manoa, from Honolulu to San Francisco	C											1					

Place		December, 1929	January, 1930	February, 1930	March, 1930 1–10	March 11–20	March 21–31	April, 1930 1–10	April 11–20	April 21–30	May, 1930 1–10	May 11–20	May 21–31	June, 1930 1–10	June 11–20
Belgian Congo	C	74													
	D	4													
Dahomey	C	19													
Indo-China (see also table above)	C	142	460	434			26	261				173	132	80	133
Ivory Coast	C					7									
Sudan (French)	C	17	229	213		200	409	371		150	40	56	178	76	
	D		25	11		18	31	30		6	7	7	18	18	
Syria: Beirut	C	25	70	18	4	8	5	10	2	7			7	6	1
Taiwan: Taihoku	C			43	31	12	15	10	2						

Place		December, 1929	January, 1930	February, 1930	March, 1930	April, 1930	May, 1930
British East Africa (see also table above):							
Kenya	C	168	12	12	175	174	
Uganda	C		184	109			78
	D		155	99			69
Chosen	C		1	4		5	
	D			1		1	
France	C	9	9	23	8		3
Mexico: Durango (see also table above)	D	4	12	6	5	4	4
Morocco	C	84	29	74		10	18
Nigeria (see also table above)	C	293					
	D	70					
Persia	C	P					
Turkey	C	883	215	114		3	16
	D	457	66	42			

TYPHUS FEVER

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930				June, 1930				July, 1930			
						10	17	24	31	7	14	21	28	5	12	19	26
Algeria:																	
Algiers	C	3	4	6	8	1	2	4	8	2		1			1	2	3
Constantine Department	C	4	5	11	15		4		2	11		1			1	1	
Oran	C	2							3				4		2	1	
Arabia: Aden	C			1													
	D			1													
Bolivia: La Paz.[1]	C		2			1											
Brazil: Porto Alegre	C		13	9	15	1		5		1		9	6		4	5	1
Bulgaria	D		1		1	1		1		1						1	
Sofia	C	1															
Chile:																	
Talcahuano	D	1															
Valparaiso	C	1															
China:																	
Manchuria—Harbin	C		1	4	52												
Shanghai	C			1													
Tientsin	C	1															

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26
Chosen (see table below).																	
Czechoslovakia (see table below).																	
Egypt:																	
Alexandria	C				1							1	1	1			
Beheira Province	C	14	18	2	2	9	21	9	10	17	16	7	5		5	1	9
	D		5			4	4	4	1	1	1		2		1		1
Cairo	C		1														
Port Said	C	2	1														
Suez	C	1															
Great Britain: Scotland—																	
Dunfermline	C																
Glasgow	C						1								1		
	D						1										
Greece (see table below).																	
Iraq: Baghdad Liwa	C			2													
Ireland:																	
Irish Free State—																	
Galway County—Oughterard	C																2
Kerry County—Dingle	C				5												
Leitrim County—Mohill	C												9				1
Mayo County—																	
Ballina	C								2		1				1		
Swinford	C						7	7									
Westport	C															2	
Roscommon County—																	
Roscommon	C															1	
Strokestown	C															1	
Wicklow County—Shillelagh	C										1		3	1		1	
Northern Ireland—Cookstown	C		3														
Latvia (see table below).																	
Lithuania (see table below).																	
Mexico: Mexico City, including municipalities in Federal District	C	12	9	4	4		2		4	2	3	1	3	2		2	
	D	4		1	4				3		1						

Morocco	C	23	21	38	15	3	6	1	1	1		6	8		4	3	4
	D			7	3												
Palestine	C		1	6	1		2			2				3	1	1	1
Poland	C	296	183	228	243	64	45	34	28	39	15	26	37		24		12
	D	21	8	13	15	2	2		1	3	3	2	3		4		
Portugal:																	
Lisbon	C				4												
Oporto	C		1	2	1												
Rumania	C	241	293	185	186	60	58	61	48								
	D	25	23	12	11	10	11	6	8								
Spain: Valencia	C										2		1		3		
	D														1		
Tunisia	C		3			2	2	1	1			2	16			14	10
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P	P	P	P	P			P	P	P	P		
Natal	C	1	3	P	P	P	P		P			P		P	P		
Orange Free State	C	P	P	P		P	P	P	P			P	P	P	P		
Transvaal	C				P												
Yugoslavia (see table below).																	

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
Chosen: Seoul	C		17		3			Lithuania	C	2	70	62	73	27	16
Czechoslovakia	C	10	2	42	29	12			D		5	4	4		
Greece: Athens	C	12	6	3	1	3		Turkey	C	2	3	1	3	16	2
Latvia	C	18					3	Yugoslavia	C	26	33	46	22	16	6
									D	3	5	2	4	1	

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (death)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

×

UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

BY THE UNITED STATES PUBLIC HEALTH SERVICE

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AUGUST 29 - - - - 1930

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

VOL. 45 AUGUST 29, 1930 NO. 35

PSITTACOSIS: EPIDEMIOLOGICAL CONSIDERATIONS WITH REFERENCE TO THE 1929-30 OUTBREAK IN THE UNITED STATES[1]

By CHARLES ARMSTRONG, *Surgeon, United States Public Health Service*

Psittacosis of man has been reported for the United States by Vickery and Richardson, 1904, Scott, 1906, McClintock, 1925, and Sailer, 1927. The 1929-30 outbreak is, however, by far the most extensive yet reported for this country. Nevertheless it seems certain that this outbreak would largely have escaped detection as to its real nature had not the press brought the condition and its striking association with parrots before the public and the medical profession.

It is, therefore, impossible to determine to what extent the recent outbreak is exceptional; but if we are correct in concluding that the disease is endemic among tropical birds, and consider the frequency with which psittacosis has been reported in other countries, it seems probable that sporadic cases have occurred more frequently in the United States than has heretofore been realized.

THE AMERICAN OUTBREAK, 1929-30

We now have a record of 74 foci of infection which gave rise to 169 cases, with 33 deaths, from November 23, 1929, to May 7, 1930. These cases occurred in 15 States and the District of Columbia and do not include 16 laboratory infections, with two deaths nor 12 probable cases which were removed from two merchant ships entering our ports following exposure aboard ship to parrots purchased in Germany and Brazil.

Owing to the stress of other duties and to the scattered location of the outbreaks it was not possible to carry out a personal investigation of the various cases, except in a few instances. The information concerning the cases here reported was secured largely through the cooperation of State and local health officials and attending physicians, and we wish to express appreciation to all who have contributed to this work.

[1] Presented at the Twenty-eighth Annual Conference of State and Territorial Health Officers with the United States Public Health Service, Washington, D. C., June 18, 1930 (held jointly with the Forty-fifth Annual Conference of State and Provincial Health Authorities of North America).

IS CONTACT WITH BIRDS SIGNIFICANT?

Some persons, and even physicians, have expressed the belief that "parrot fever" is nothing but "ordinary pneumonia" associated with the presence of a parrot. This view of course neglects the fact that psittacosis does not present the combined epidemiological, clinical, X-ray, and pathological picture of any "ordinary pneumonia" seen in this country. Moreover, the reported cases were not simply associated with parrots but with *newly acquired* tropical birds which in nearly every instance *were ill.* That this selectivity was not dictated by the press is indicated by the fact that the Public Health Service has received scores of communications by letter, telegram, and telephone, inquiring whether apparently well birds which had been on hand for varying periods up to 30 years were dangerous.

Nevertheless, it was deemed desirable to determine the occurrence of illness among a control group of persons who had recently acquired apparently normal parrots. With this end in view, a random sample of 103 parrots were traced to their ultimate destinations. These birds were sold by the same dealers and during the same time, November and December, 1929, as were many of the incriminated parrots. Eighty-eight of the 103 parrots were described as apparently in perfect health, and among the families exposed to them there was not a single suspected illness reported.

The remaining 15 parrots of the series either had died or were killed on account of illness. One of these birds had given rise to six cases of typical psittacosis. There was no human illness reported from contacts with the 14 other sick birds, of which the character of illness is of course unknown.

SPECIES OF BIRDS INCRIMINATED

Parrots were associated with the development of 55 foci of disease, parrakeets with four, "love birds" three, canaries three, while in nine outbreaks exposure was to multiple species.[1]

DIRECTION OF THE INFECTION

In view of the notable association between psittacosis cases and ill birds it becomes desirable to inquire whether infection usually travels from bird to man or in the opposite direction, as some have suggested. That man is usually infected from birds seems indicated by the fact that the latter usually appeared ill and in many instances had actually died before symptoms appeared among members of the affected household. Moreover, the occurrence of synchronous household cases so frequently noted in this and other outbreaks of psittacosis is most readily explained by assuming a synchronous ex-

[1] The parrots were described as Amazons in 7 instances, South American 8, Panama 6, Cartagena 7, Mexican double-yellow head 3, yellow head 5, Mexican 1, Cuban 2, Porto Rican 1, Brazilian 2, "Parrots" 13. Shell parrakeets were involved in 2 outbreaks and "parrakeets" in 2.

posure to some common source of infection. That this common focus of infection is usually some type of parrot is indicated by the prompt subsidence of outbreaks which have occurred in this and other countries following the decreased traffic in climbing birds occasioned through publicity or official decree.

Again, if birds are actually the source of infection in psittacosis, employees of affected pet shops, as a class, might be expected to sicken earlier than do their patrons who somewhat later come in contact with the affected birds. It was possible to verify this hypothesis in one outbreak of 18 cases which occurred among employees and patrons of a pet shop. (Chart 1.)

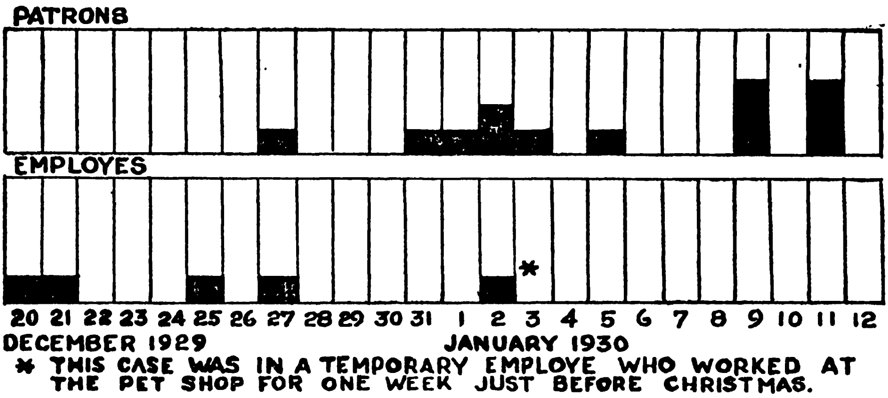

CHART 1.—Dates of onset of psittacosis among employees and patrons of an affected pet shop

And then, again, the fact that man is so rarely infected through contact with human psittacosis cases argues against the latter being a dangerous source of infection for birds, which are probably no more susceptible to the malady than are human beings.

IMPORTATION OF TROPICAL BIRDS

Information supplied by the Bureau of Biological Survey of the United States Department of Agriculture shows that from 50,000 to 60,000 birds of the parrot family and 300,000 to 350,000 canaries were imported into the United States during 1929.

Birds incriminated in the production of psittacosis (1929–30) are known to have come from Brazil, Colombia, Cuba, Nicaragua, Honduras, Germany, Trinidad, Salvador, Mexico, and Japan. The majority of these birds were imported by several large dealers in New York City, who, during November and December, 1929, received shipments from the first six named countries. It is possible that some of the incriminated birds might have been infected through contacts in the pet shops. It is believed, however, that this source of infection would be inadequate to explain the almost synchronous appearance of psittacosis in Argentina, Algeria, Germany, Austria, England, Holland, Czechoslovakia, Denmark, Switzerland, France, Spain,

Portugal, Canada, Hawaiian Islands, and the United States, unless it occurred in the shops at the sources of supply.

Furthermore, we have a record of 13 human cases which followed exposure to birds brought from Trinidad or Brazil, Cuba, and Germany by crews or passengers on different ships and from Mexico by rail. These birds did not pass through any pet shops in the United States. These considerations, together with the fact that sporadic outbreaks have been repeatedly reported in this and other countries during earlier years, leads one to the conclusion that psittacosis is a widely spread endemic disease among birds transported from the Tropics.

INFECTIVITY OF PSITTACOSIS

Bird to man.—The occurrence of sharp household outbreaks of psittacosis in homes harboring infected birds has been repeatedly observed and indicates that the disease is highly communicable from birds to man. The outbreak at the Hygienic Laboratory [1] reported by McCoy, 1930,[2] denotes a degree of infectivity approaching that of measles or smallpox. In this outbreak there were 11 cases developed among employees of the main laboratory building wherein the birds were housed. Only two of this number, however, had had direct contact with the parrots or had even entered the small rooms in which the birds were kept.

Where multiple cases develop in a household it frequently happens that the patients all become sick within a few days, thus indicating a synchronous infection even though the exposure to the birds has extended over a considerable period. This indicates that the infected birds are more dangerous at some periods than at others; and it is probable that this greater infectivity is dependent upon an active state of the disease. Infection, however, occasionally follows exposure to apparently well birds or to bird carriers.

One of our cases sickened on March 15 with a severe type of the disease following exposure to two shell parrakeets which were purchased just before Christmas, 1929. One bird was rather out of sorts shortly before March 15, the illness being attributed to eating gilt from a picture frame. It was apparently well after three or four days. Both birds are still under observation by the writer and appear perfectly healthy (June 15, 1930). The patient was an occasional visitor to the pet shop before her illness, but the proprietor of the shop claimed to have had no unusual illness or deaths among his birds and no other cases were traced to birds from this source.

Three other cases followed contact with a canary purchased on December 12, 1929, which was not apparently ill, but whose cage at

[1] Now the National Institute of Health.—Ed.

[2] Public Health Reports, Apr. 18, 1930, p. 843.

the store had hung near a parrot that appeared sick. Two of the patients had visited the pet shop when the canary was purchased and possibly may have contracted the infection there. These two cases sickened December 24 and 26, respectively. The third case had had no contact with birds other than the canary and sickened also on December 24.

Leichtenstern, Kerschensteiner, Krumeich, Hutchison, Rowlands, and Simpson, and others have also observed cases which followed contact with apparently well birds. The last-mentioned observers cite a case which followed a bite on the tongue by an African gray parrot which was ill when captured some 14 months previously, but which apparently recovered after a few weeks. The character of its illness is of course unknown. Pesch was able to transmit psittacosis experimentally from a recovered parrakeet by means of droppings and filtered organ extracts.

Bird to bird.—The cases of psittacosis which developed during the 1929–30 outbreak in the United States were largely attributable to contact with birds imported by several large New York dealers during November and December, 1929. During this period these dealers imported 2,100 "talking parrots," from which some 45 known foci of psittacosis resulted. Among a random sample of 103 of these birds which were sold there were 15 which subsequently died or were killed on account of illness, only one of which is known to have had psittacosis; while 88 of the birds showed no signs of illness and produced no human cases, notwithstanding the fact that most of them must at some time, and perhaps for considerable intervals, have been housed in the same quarters with infected birds. An even lower rate of infection is indicated for parrakeets and love birds, many of which must have been similarly exposed, since these same dealers during the same critical period imported 5,100 of these birds and yet only seven foci with 12 human cases are known to have resulted from them. Likewise, canaries seem to have largely escaped infection, since among 300,000 to 350,000 imported during 1929, many of which were probably exposed to infection in pet shops, there were only three instances, with a total of six human cases, reported in which canaries were held blamable. At the Hygienic Laboratory a number of parrots and shell parrakeets failed to develop detectable symptoms following exposure to supposedly psittacosis material, notwithstanding they were housed during the tests, January 16 to March 8, in the same room (in individual cages) with definitely ill and dying birds which served to infect people as early as January 25. Neither was there any spontaneous illness noted among a number of "normal birds" housed in an adjoining room.

In the recent outbreak several instances were noted where only one of two birds in the same cage sickened; others have noted similar

instances. For example, Maragliano placed two canaries and two parrots in the cage of an infected parrot, and one parrot sickened and died on the twelfth day, while the other and the two canaries remained apparently well. Leichtenstern cites a similar case where two canaries and two parrots were placed in the cage of an infected parrot and yet remained apparently well.

It is possible that this apparent insusceptibility of birds to infection is due to an active immunity gained through earlier attacks. However, the frequency with which birds suffer and die with psittacosis under some conditions of captivity, together with the absence of reported outbreaks among birds in nature or in the large, well-kept zoos of this country and of Europe, and in view of the absence of reported human cases from contact with such birds, rather speaks against this interpretation and for a naturally relatively low susceptibility of birds to the infection except under special conditions.

Bearing this consideration in mind, it is interesting to note that most of the recorded outbreaks of psittacosis (see review of outbreaks) have occurred in the temperate zone and during the cold months, and it may be that sudden changes of climate are of importance in reducing the general resistance of birds to infection.

It has also been stated that the early outbreaks of psittacosis followed an effort on the part of shippers to reduce the relatively high cost of modern transportation by crowding many birds into small and necessarily unhygienic cages. This tendency has increased until at present as many as 25 large parrots may be shipped in a box with one open side and with an allowance of approximately one-half cubic foot of space or less for each bird. If we are figuring air space the bulk of the birds own body must be subtracted from this already inadequate allowance. With many such crowded cages stored in the hold of a ship, proper sanitation is difficult. That many birds die in transit is well known, and it would seem that this crowding and insanitary condition must serve to depress the vitality of the survivors and favor the spread of psittacosis among them; for we and others have shown that the disease may be transmitted by means of food and water contaminated with the droppings of infected birds.

Man to man.—Instances of infection from patient to patient are rare but have been occasionally reported. Some of these purported instances are, however, questionable, because the infection was acquired following contact with patients in surroundings which had recently harbored the incriminated birds. The significance of contact with such surroundings is shown by the Hygienic Laboratory outbreak. In this outbreak there was, however, not a single case of contact infection among the physicians, nurses, attendants, relatives, or friends of

any of the 11 cases. There are, however, a few instances in which the infection does seem to have been transmitted from patient to patient.

One patient of our series had visited the bird department of a large store, where her sister was employed, on December 4, 5, or 6, 1929, and was at the store again on the 17th, but not in the bird department. The same day (December 17) she visited at the home of her sister who had developed symptoms on December 13. She also served as her nurse from December 19 to 24, the date of death. During this interval she collected the patient's sputum onto paper napkins but wore no gloves; she had an open sore on one of her hands at the time. She developed symptoms on December 28.

Another case was in a nurse who had had no known contact with tropical birds, but who had from February 2 to February 10 nursed a typical and fatal case of psittacosis; she sickened on February 21 with a typical severe attack.

Leichtenstern, Adamy, Bedson, Western, Simpson, Günther, Gastau, and others have reported similar instances. Hegler reported a remarkable instance in which several persons who were in attendance upon a case in a hospital developed the disease. Cases from human contact are, however, exceptional.

INCUBATION PERIOD

The interval from the first known exposure to infected birds to the onset of symptoms in the 169 cases here considered varied from 6 to 82 days. In 45 instances, however, the disease followed the first exposure by 6 to 15 days, which is usually considered to be the incubation period. There were, in addition, two cases which developed on the tenth day following a single exposure of two hours' duration in a home harboring an ill parrot and three human cases. In another instance a woman who visited for one day in an infected home also developed symptoms on the tenth day following.

SEX DISTRIBUTION OF CASES

Among 167 cases of known sex which occurred in the United States there were 105 females and 62 males, or 63 and 37 per cent of the total, respectively. This preponderance of cases among females is probably a reflection of the fact that in this country, exposure usually occurred in the home where women spend a relatively larger amount of their time than do the men. The care of the birds also commonly falls to the women. In the Argentine outbreak where exposure was largely from an exhibit of fancy birds, Barres noted the infection as being three times as prevalent among males as females. He states that men attended the exhibits more than did the women. The age distribution of cases is shown in Chart 2.

DIAGNOSIS AND SYMPTOMS

A history of exposure to recently acquired tropical birds, especially if ill, is of importance. The clinical picture, while varying in dif-

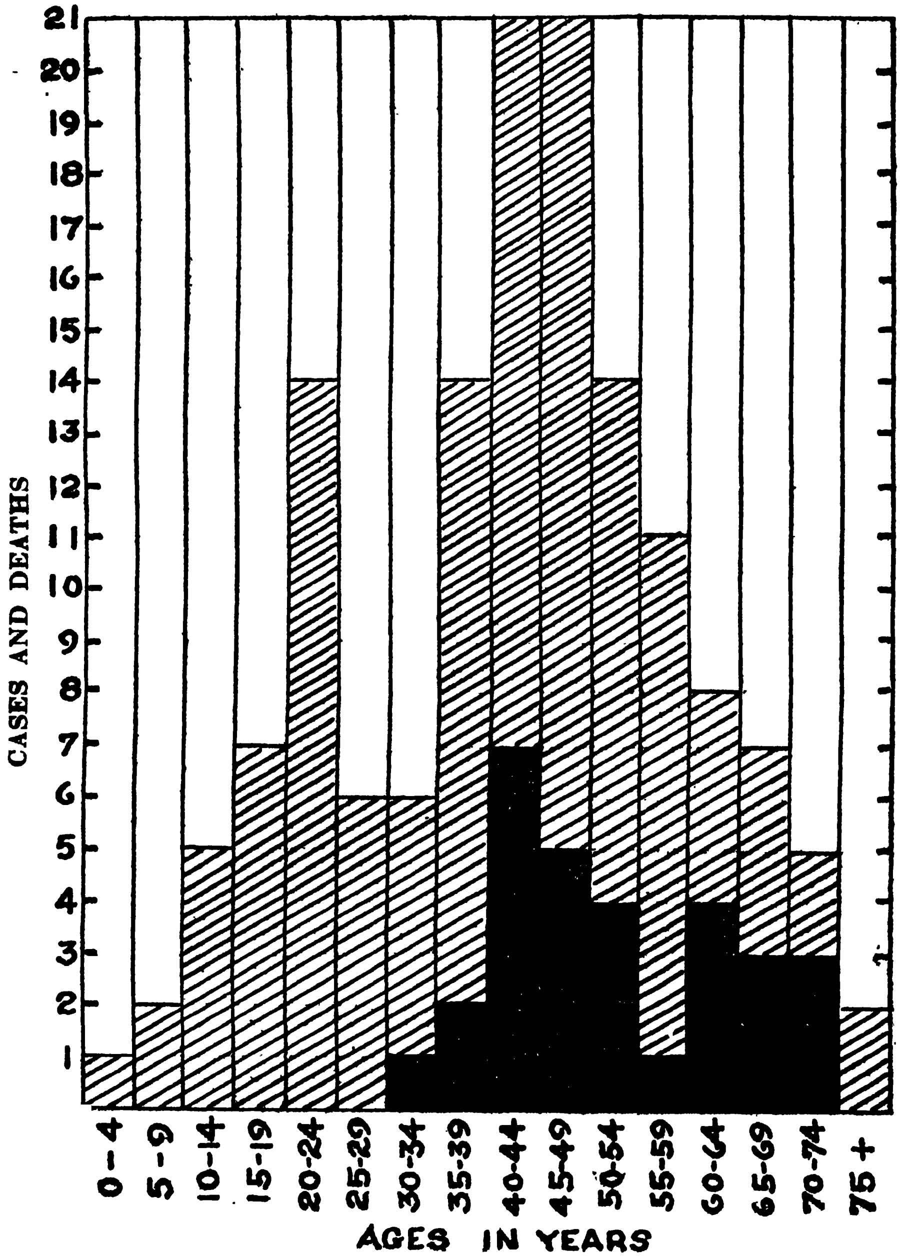

CHART 2.—Psittacosis cases and deaths by age groups. (Shaded areas represent cases; black areas, deaths)

ferent cases, is nevertheless strikingly uniform and most often confused with influenza and typhoid fever. Many excellent clinical reports are readily available; consequently we will not cite case histories.

The disease may begin suddenly with chilly sensations, fever, and headache, or these may appear after a few days during which the patient has not felt exactly well. The fever when first recorded is usually 100° to 102° F. and tends with irregular remissions to rise to a height of 103° to 105° during the second week. The pulse is likely to be slow, considering the temperature. Nosebleed is not uncommon. Focal lung lesions with physical signs may be present at the first examination or appear after three or four days. There is usually but little cough or expectoration early, but these may develop later. The cough is usually nonproductive. Chest pains may be present. The tongue, as a rule, presents a heavy white to brownish coat, with red edges, but may be cracked and dry. The appetite is lost and constipation is the rule. Abdominal distention is troublesome in many cases. Albuminuria is a very constant accompaniment after the disease is established, and retention may be present. "Rose spots" have been occasionally reported.

The blood count is usually normal or slightly above normal during the first few days, but a leucopenia is the rule later on. In one case the count was as low as 600 cells on the twentieth day of illness, but counts from 3,000 to 5,000 are more common. Delirium is common when the temperature is high; stupor may be present. Dreams are likely to disturb the sleep, and insomnia may be troublesome. The fever may terminate after about eight days or continue for three weeks or more. Table 1 shows the relative frequency of occurrence of the more common symptoms as reported for the 169 cases.

TABLE 1.—*Most frequently recorded symptoms in 169 cases*

Symptom	Number of cases in which present	Number of cases in which absent	Unknown	Symptom	Number of cases in which present	Number of cases in which absent	Unknown
Headache	112	13	44	Constipation	87	36	46
Malaise	107	14	48	Coated tongue	85	20	64
Cough	106	23	40	Delirium or stupor	48	69	52
Chills	98	25	46	Nosebleed	25	96	48
Pains other than head	95	28	46	Diarrhea	13	110	46
Anorexia	92	24	53				

Relapses.—Relapses are not uncommon. Three of the 11 Hygienic Laboratory cases suffered relapses during the first three weeks following the return of the temperature to normal. The relapses began with symptoms similar to the original onset but ran milder courses, the temperature rising to 100°–102° F. and then gradually falling in a few days. A relapse occurred in another case in Washington after three weeks of normal temperature. These four relapses occurred among some 13 cases treated with convalescent serum, and one wonders if this form of treatment predisposes to relapse.

Complications.—Phlebitis is the most common complication.

PROGNOSIS

Among 169 cases of psittacosis recorded in the recent outbreak, there were 33 deaths reported (19 per cent). It is possible, however, that other deaths occurred in this series, since many of our reports were secured prior to the termination of the illness. Age is an important factor in determining the outcome, children and young adults tending to have light attacks. There was not a death reported among 35 patients under 30 years of age, while approximately 24 per cent of patients over that age died.

Death is probably due to the pneumonic involvement in most cases, and occurs usually from the seventh to fifteenth day of illness; later deaths, however, occasionally occur and may be due to the loosening of a complicating venous thrombus. At least two deaths attributed to this cause occurred among the above-mentioned fatal cases.

PREVENTION

Theoretically the control of psittacosis in man is simple and consists in the avoidance of contact with tropical birds. Practically, however, it may be difficult permanently to prevent traffic in birds which are favored as pets by a considerable group of our population. Methods aimed toward rendering the traffic harmless rather than toward preventing it are therefore desirable. Strictly scientific information is, however, not yet available for the guidance of such a plan.

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ACUTE RESPONSE OF GUINEA PIGS TO VAPORS OF SOME NEW COMMERCIAL ORGANIC COMPOUNDS

VI. DIOXAN[1]

By W. P. YANT, *Supervising Chemist;* H. H. SCHRENK, *Chemist in Charge, Toxicological and Biochemical Laboratory;* C. P. WAITE, *Assistant Surgeon,*[2] and F. A. PATTY, *Assistant Physiological Chemist, Health Laboratory Section, Pittsburgh Experiment Station, United States Bureau of Mines*

This report on the acute response of guinea pigs to dioxan gas is the sixth of a series of similar reports which deal with studies pertinent to evaluating the hazards involved in exposure to some chemical products which have recently reached, or promise to reach, important domestic and industrial use. The first report of the series dealt with ethylene dichloride,[3] the second with ethyl benzene,[4] the third with "Cellosolve" (ethylene glycol monoethyl ether),[5] the fourth with ethylene oxide,[6] and the fifth with vinyl chloride.[7]

The investigation was undertaken at the request of the Carbide & Carbon Chemicals Corporation and was conducted jointly with the

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[1] Published by permission of the Director, U. S. Bureau of Mines.

[2] Assistant surgeon, U. S. Public Health Service, detailed to the Bureau of Mines.

[3] Sayers, R. R., Yant, W. P., Waite, C. P., and Patty, F. A.: Acute Response of Guinea Pigs to Vapors of Some New Commercial Organic Compounds. I. Ethylene Dichloride. Pub. Health Reports, vol. 45, No. 5, Jan. 31, 1930, pp. 225–239. (Reprint No. 1349.)

[4] Yant, W. P., Schrenk, H. H., Waite, C. P., and Patty, F. A.: Acute Response of Guinea Pigs to Vapors of Some New Commercial Organic Compounds. II. Ethyl Benzine. Pub. Health Reports, vol. 45, No. 22, May 30, 1930, pp. 1241–1250. (Reprint No. 1379.)

[5] Waite, C. P., Patty, F. A., and Yant, W. P.: Acute Response of Guinea Pigs to Vapors of Some New Commercial Organic Compounds. III. "Cellosolve." Pub. Health Reports, vol. 45, No. 26, June 27, 1930, pp. 1459–1466. (Reprint No. 1389.)

[6] Waite, C. P., Patty F. A., and Yant, W. P.: Acute Response of Guinea Pigs to Vapors of Some New Commercial Organic Compounds. IV. Ethylene Oxide. Pub. Health Reports, vol. 45, No. 32, August 8, 1930, pp. 1832–1843. (Reprint No. 1401.)

[7] Patty, F. A., Yant, W. P., and Waite, C. P.: Acute Response of Guinea Pigs to Vapors of Some New Commercial Organic Compounds. V. Vinyl Chloride. Pub. Health Reports, vol. 45, No. 34, August 22, 1930, pp. 1963–1971. (Reprint No. 1405.)

United States Bureau of Mines. The experiments were carried on at the Pittsburgh Experiment Station of the Bureau of Mines.

SCOPE OF WORK

The scope of the work included a study of the toxicity of dioxan and the physiological response to its vapors as determined by exposure of guinea pigs. Only acute effects as produced by a single exposure were studied. The experiments were planned to give information relative to the concentrations and periods of exposure which produce but slight response, moderate response, and serious response.

CHEMICAL AND PHYSICAL PROPERTIES

1, 4-Dioxan or diethylene dioxide $\left(O \left\langle \begin{matrix} CH_2 - CH_2 \\ CH_2 \quad CH_2 \end{matrix} \right\rangle O \right)$ is the second ether of ethylene glycol. A detailed description of the chemical and physical properties, and probable uses of this new product have been given by Reid and Hofmann.[8] It is a colorless liquid miscible in all proportions with water and the ordinary organic solvents. It is quite stable, being little affected by acids, alkalies, or oxidizing agents, at ordinary temperatures. Its physical properties are as follows: Melting point, 11° C.; boiling point, 101.1° C.; density, 20° C., 1.0338; and vapor pressure 17, 28, 47 mm. Hg. at 10°, 20°, and 30° C., respectively. It forms a constant boiling mixture, 80 per cent dioxan and 20 per cent water, with a boiling point 86.8° to 86.9° C. at 742 mm. Hg.

The odor is faint and pleasant, described by some persons as similar to absolute ethyl alcohol.

SUGGESTED USES FOR DIOXAN

The following are suggested uses for dioxan: Solvent in the manufacture of lacquers, celluloid, and similar products where nitrocellulose, cellulose acetate, or other cellulosic esters or ethers are used; a wetting agent for materials not easily wet with water; a solvent for fats, oils, and greases; in dye baths and dye or stain compositions; preparation of varnishes, polishing compositions, paint and varnish removers, detergent and cleaning preparations, toilet preparations and cosmetics, cements, glues, shoe creams, emulsions; and as a preservative, fumigant, or deodorant.

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[8] Reid, E. W., and Hofmann, H. E.: 1, 4-Dioxan. Ind. & Eng. Chem., vol. 21, 1929, pp. 695–697.

TEST APPARATUS

The apparatus for preparing dioxan-air mixtures and for exposing animals was the same as that described in a previous report dealing with ethylene dichloride,[9] with the exception that the constant feed device for introducing the liquid dioxan was a modification of the floating siphon described by Sullivan.[10]

COMPUTATION AND ANALYSIS OF GAS-AIR MIXTURES

The composition of the dioxan vapor-air mixtures was calculated from the quantity of liquid vaporized and the quantity of air contained in or flowing through the animal exposure chamber. The calculated composition was always checked by absorption of the vapors from a measured volume of the mixture by air-equilibrated activated charcoal and determining the gain in weight.

TEST PROCEDURE, DESCRIPTION, AND CARE OF ANIMALS

The test procedure and description and care of animals were the same as those described in the report dealing with ethylene dichloride.[11]

RESULTS OF TESTS

The detailed test data are too voluminous to be presented in this report, and only summarized results pertinent to symptoms, gross pathology, and fatality are given. Specimens of tissue were taken for microscopic examination, a report of which will be made later.

SYMPTOMS OF ANIMALS

Control animals.—No symptoms were exhibited by the 15 control guinea pigs used in these tests. Also, no deaths occurred.

Exposed animals.—The symptoms exhibited by exposed animals were irritation of the eyes and nose, retching movements, changes in the respiration, and apparent narcosis.

Table 1 gives the average period necessary to produce these symptoms by various concentrations of the vapor in air. When viewing the table it should be noted that the figures in parentheses indicate that the particular symptoms did not occur in the maximum period of exposure as given, whereas all the remaining values indicate the average time for occurrence of the symptoms.

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[9] See footnote 3.

[10] Sullivan, John D.: Device for Maintaining a Constant Rate of Flow of Liquids. Ind. & Eng Chem., anal. ed., vol. 1 (1929), p. 233.

[11] See footnote 3.

TABLE 1.—*Symptoms produced in guinea pigs exposed to vapors of dioxan*

Type of symptom	Concentration of vapor and period of exposure causing symptoms [1]				
	3.0	1.0	0.3	0.2	0.1
Nasal irritation, scratching at nose	[2] 1	[2] 1	[2] 1	[2] 1	[2] 1
Eye irritation, squinting, lacrimation	[2] 1	[2] 1	8	5	[3] (480)
Retching movements or marked expiratory effort, spasmodic contraction of abdominal wall, head lifted, mouth open	2–10	19–27	[3] (480)	[3] (480)	[3] (480)
Changes in respiration:					
Dyspnea	45–116	[3] (480)	[3] (480)	[3] (480)	[3] (480)
Shallow, rapid	75–123	[3] (480)	[3] (480)	[3] (480)	[3] (480)
Gasping	116	[3] (480)	[3] (480)	[3] (480)	[3] (480)
Shallow, slow	508–540	[3] (480)	[3] (480)	[3] (480)	[3] (480)
Narcosis—fall to sides, remain quiet	87–141	[3] (480)	[3] (480)	[3] (480)	[3] (480)

[1] Concentration of vapors in per cent by volume; time in minutes.
[2] Evident almost immediately—intensity increased with increasing concentration.
[3] Not observed during maximum exposure as given in parentheses.

Signs of nasal irritation manifested by the animals in scratching at the nose were noted in all the concentrations from 0.1 to 3.0 per cent by volume, inclusive, and were evident as soon as the animals were put on test. The intensity of the irritation was apparently related directly to the concentration of the vapor, but decreased in apparent intensity as the exposure to a particular concentration was prolonged.

Eye irritation as shown by squinting and lacrimation was also observed in all concentrations of the vapor used, except the lowest (0.1 per cent). This effect of the vapors also apparently increased in intensity with an increase in concentration of the vapors, but, as in the case of nasal irritation, it also decreased in apparent intensity as the time of exposure to a particular concentration was prolonged.

The retching movements noted consisted in spasmodic contractions of the abdominal muscles accompanied by a lifting of the head with the mouth held open. It resembled an attempt to vomit or a forceful expiratory effort. A similar symptom has been noted as occurring on exposure of guinea pigs to vapors of other commercial organic compounds.[12] This retching movement was noted only on exposure to 3.0 and 1.0 per cent vapors. It did not occur in all the pigs, was irregular in its time of occurrence, and ceased when the pigs were in an apparent unconscious condition.

Changes in the respirations and narcosis were noted only in the pigs exposed to 3.0 per cent vapors for a period of three hours or more. As near as could be ascertained, the respirations were first labored, then became shallow and rapid, during which time occasional gasping was noted; and as a terminal condition the respirations became shallow and slow until death ensued.

[12] See footnote 3.

The narcosis or apparent unconsciousness was produced within 87 to 141 minutes' exposure to 3.0 per cent vapors. It was usually preceded by a period not very well definable in which the pigs were unsteady, and staggered on attempting to walk.

SYMPTOMS EXPERIENCED BY MEN

Five persons were exposed for one minute to air containing 0.55 per cent by volume of dioxan vapor. The symptoms noted were as follows: Irritation to the eyes resulting in blinking, squinting, and lacrimation. A burning sensation was present in the nose and throat. The odor and burning sensation in the nose and throat were similar to that experienced in breathing concentrated vapors of ethyl alcohol. Three of the subjects noticed a slight vertigo which disappeared quickly after leaving the vapor-air mixture.

The same five persons were exposed to air containing 0.16 per cent of dioxan vapor for a period of 10 minutes. They noted an immediate slight burning of the eyes accompanied by lacrimation; also slight irritation of the nose and throat. The alcohol-like odor of dioxan was easily noticeable at first, but decreased in intensity with continued exposure. Lacrimation and nasal irritation persisted throughout the test. No vertigo was noted. One person complained of "upset stomach" after exposure. The atmosphere was not intolerable but easily noticeable.

GROSS PATHOLOGY

Control animals.—Fifteen control animals were killed for autopsy. They were taken from the same stock and selected in the same manner as the animals used for exposure to dioxan-air mixtures. No gross pathological changes resembling those found in the animals exposed to vapors were observed.

Exposed animals.—The pathological findings in animals that died during exposure (see fig. 1 for condition of exposure) were congestion and edema of the lungs, with a congestion of the surface vessels of the brain. The lungs were deep pink in color, and a bloody fluid exuded from cut section. Opening of the trachea and bronchi revealed the presence of small quantities of a frothy serous exudate and an injection of the vessels of the lining mucous membrane. The hyperemia of the brain was rather pronounced and easily detected in these cases.

The findings of the animals that were killed immediately after test, following exposure to conditions that caused death to the majority of the group within one to eight days (see fig. 1 for conditions of exposure) were congestion and edema of the lungs, similar to that previously described, hyperemia of the surface of the brain, and paleness of the liver on the surface and cut section. Those animals that died within one day showed the same findings with fairly well-described areas of congestion throughout the lungs, and a few small hemorrhagic areas

in the mucous membrane of the stomach. The animal that died two days after exposure showed a beginning broncho-pneumonia in the lungs, with a severe congestion of the surface vessels of the brain. The findings in the animals that were killed one day after exposure were similar to those in the animals that were killed immediately after test.

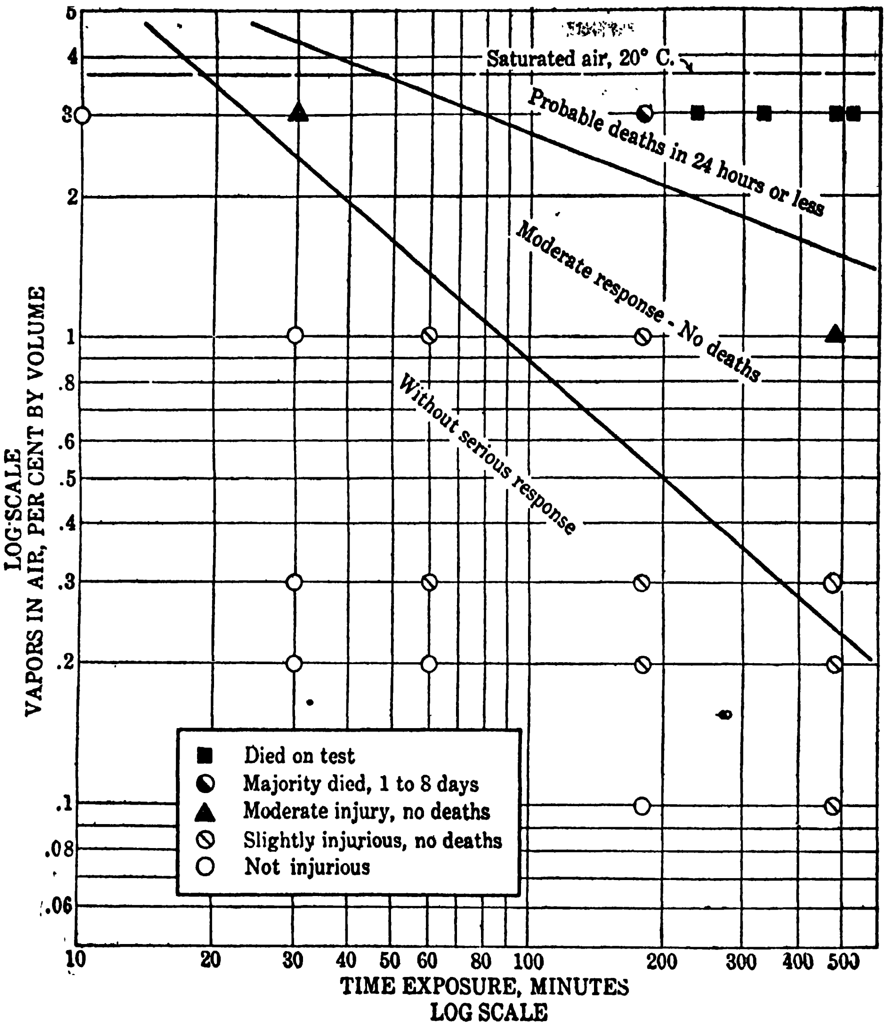

FIGURE 1.—Acute effects of exposure of guinea pigs to dioxan vapors in air

The findings in the animals killed immediately after exposure to conditions (see fig. 1 for condition of exposure) that did not cause death but produced what was classified as moderate injury, were hyperemia of the lungs and large air passages and hyperemia of the surface of the brain. The animals killed four to five days later usually showed patches of congestion in the lungs, and a hyperemia of the surface of the brain. The autopsies performed 9 to 10 days after exposure were negative for any gross pathological manifestations.

The findings of the animals killed immediately after exposure to conditions that did not cause death but produced slight injury (see fig. 1 for conditions of exposure) were a hyperemia of the lungs such as might be expected from a mild irritation. The pigs autopsied 4 to 6 days after exposure were negative for gross pathological changes except in 4 cases of a total of 14, in which small areas of congestion were found in the lungs. The pigs autopsied 8 to 10 days after exposure were negative for gross pathological changes except a few cases of hyperemia areas of congestion in the lungs.

DISCUSSION OF PATHOLOGY

Dioxan vapor is a very mild lung irritant. This is probably its chief action from the standpoint of producing pathological changes. An effect on the central nervous system is manifested by the symptoms and the hyperemic appearance of the vessels of the brain. The brain pathology is, however, very moderate from the standpoint of visible gross damage.

FATALITY AND SUMMARY OF PHYSIOLOGICAL RESPONSE

A summary of the fatality and response of guinea pigs exposed to various concentrations of dioxan in air is shown graphically in Figure 1, and given in conventional degrees of response in Table 2. The results of each experiment are designated by a symbol which represents one of five different degrees of severity. With the exception of concentrations causing death during exposure for which the results obtained for individual animals are given, the selected symbol describes the results obtained for at least one-half the individual animals, and in most cases the results for the majority of a group (at least three and usually six animals) exposed to a given condition.

It will be noted from the legend on Figure 1 that the five degrees of response are as follows:

1. Died on test.
2. Majority died, one to eight days.
3. Moderate injury, no deaths.
4. Slightly injurious, no deaths.
5. Not injurious.

In addition to representing the response of each group by symbols, the symbols have been separated into three general fields or zones of probable response, namely:

1. Probable death, 24 hours or less.
2. Moderate response, no deaths.
3. Without serious response.

Table 2 gives the concentrations which produce the degrees of response generally reported in the literature dealing with noxious

gases. These data may be compared with toxicological data given in the literature for other compounds.[13] [14] [15] [16] [17]

TABLE 2.—*Acute effects of exposure of guinea pigs to dioxan vapor in air*

Effects of exposure after various periods of time	Concentration, per cent by volume
1. Kills in a very short time	(1)
2. Dangerous to life in 30 to 60 minutes	(1)
3. Dangerous to life after several hours' exposure	1. 5-3. 0
4. Marked symptoms in 30 to 60 minutes	. 6- . 8
5. Maximum amount for 60 minutes without marked symptoms	. 4- . 5
6. Maximum amount for several hours without marked symptoms	. 3- . 4
7. Maximum amount for several hours with but slight or no symptoms	. 2- . 3

[1] Not produced by 3 per cent dioxan vapor in air, which is approximately 80 per cent of saturation value for air at 20° C.

CAUSE OF DEATH DURING AND FOLLOWING EXPOSURE

It is not clear whether the cause of death was irritation of the lungs or a state of narcosis which terminated in death. With the exception of one group of animals, death either occurred during exposure or the animals recovered. In the exceptional case (exposure to 3 per cent for three hours) the animals were in an apparent state of marked narcosis at the end of the exposure and did not fully recover from that condition in two days following, during which death occurred. They remained on their sides, making feeble attempts to regain a normal position. In many respects the symptoms resembled the sequela of profound asphyxia.

HEALTH HAZARDS FROM DIOXAN VAPOR

The physiological response of guinea pigs to dioxan vapor indicates that the hazard to health from breathing contaminated air is slight. This of course presumes ordinary conditions of ventilation and reasonable conditions of exposure, and excludes such conditions as exposure to the air confined over dioxan liquid in tanks, other confined spaces, or localized places as open tanks or vats where the air would become saturated with the vapor. The health hazards from dioxan vapor are further mitigated by the warning response manifested as eye and nose irritation when the gas is present in concentrations below those which cause harm. After but a few minutes' exposure to concentrations of 0.2 per cent the pigs exhibited signs of

[13] See footnotes 3, 4, 5, 6, 7.

[14] Cotton, R. T., and Young, H. D.: The Use of Carbon Dioxide to Increase the Insecticidal Efficiency of Fumigants. Proc. Entomological Soc. of Washington, vol. 31, 1929, pp. 97-102.

[15] Sayers, R. R., Yant, W. P., Thomas, B. G. H., and Berger, L. B.: Physiological Response Attending Exposure to Vapors of Methyl Bromide, Methyl Chloride, Ethyl Bromide, and Ethyl Chloride. Pub. Health Bull. No. 185, 1929, 56 pp.

[16] International Critical Tables, first edition, 1927, vol. 2, p. 318. Also see errata sheet, vol. 2.

[17] Henderson, Yandell, and Haggard, Howard W.: Noxious Gases. American Chemical Society Monograph No. 35, 1927, Chemical Catalog Co., New York.

the warning response by scratching their noses and by squinting and lacrimation. Persons exposed to 0.16 per cent observed an immediate slight burning of the eyes accompanied by lacrimation, and when exposed to 0.55 per cent there was an immediate marked degree of the same symptoms with the addition of a burning sensation in the throat. Since an exposure of two to three hours to 3 per cent dioxan vapor (air approximately 80 per cent saturated at 20° C.) was required to kill guinea pigs, and eight hours' exposure to 1 per cent vapor in air did not cause death, it appears that persons would not voluntarily tolerate atmospheres which would cause serious acute poisoning and that no acute trouble will be experienced if the symptoms of eye and nasal irritation are regarded as a warning to avoid further exposure.

As far as the writers know, the inflammable limits of dioxan vapor have not been determined, but the Bureau of Mines is now undertaking this determination. From a theoretical consideration and comparison with other compounds, it is estimated, however, that the lower inflammable limit would be in the range of 1 to 1.5 per cent vapor in air by volume or, in general, similar to the vapor of such compounds as gasoline and benzene. It is thus very probable that the hazards to life from inflammable mixtures exceed the hazards from acute poisoning; but, as in the case of poisoning, they are also mitigated by the warning properties of the vapor.

ACKNOWLEDGMENTS

The writers desire to give acknowledgment to J. G. Davidson, manager of the chemical sales for the corporation mentioned, and to E. W. Reid, senior fellow of the firm's fellowship at the Mellon Institute, Pittsburgh, Pa., for sponsoring the investigation; to R. R. Sayers, chief surgeon, Bureau of Mines, surgeon, United States Public Health Service, for suggestions and advice; and to John Chornyak, medical officer in charge, pathological laboratory, for assistance in performing the experimental work.

SUMMARY AND CONCLUSIONS

The acute physiological response of guinea pigs to air containing dioxan vapor was determined. The concentration of vapor and periods of exposure ranged from those which produced death to those which caused no apparent effect after several hours' exposure. The symptoms, gross pathology, and fatality are given, with a discussion of potential hazards.

1. The symptoms are principally those of eye and nasal irritation, with signs of lung irritation after long exposure, and narcosis with high concentration.

2. The principal gross pathological findings were congestion and edema of the lungs and hyperemia of the brain.

3. Because of the comparatively low vapor pressure of dioxan it is not possible to attain concentrations in air at 20° C. which will kill guinea pigs in less than two to three hours' exposure. Concentrations of 1 per cent did not cause death after eight hours' exposure.

4. Dioxan vapor possesses warning properties manifested as eye, nose, and throat irritation. Persons exposed to 0.16 per cent in air by volume immediately experienced a slight irritation of the eyes and nose, with lacrimation. Exposure to 0.55 per cent produced a marked and discomforting degree of the same symptoms with the addition of a burning sensation in the throat.

5. Considering the comparatively low toxicity of dioxan vapor and the warning intensity of concentrations below those which produced serious harm to guinea pigs, it appears that health hazards from breathing the vapors are slight under ordinary conditions of usage and reasonable exposure. As in the case of practically all comparatively nontoxic volatile liquids, however, dioxan presents a hazard to life under conditions of exposure to air confined over the liquid in tanks, vats, and similar places where high concentrations would accumulate.

THE LOSS OF LIGHT IN NEW YORK CITY DUE TO SMOKE

The contamination of the atmosphere by smoke from the chimneys of private houses, office buildings, industrial plants, steam engines, tugs, and steamships has become a serious matter in several of the larger cities of the United States. The presence in the air of large numbers of particles of soot and ash, and of appreciable amounts of sulphuric acid and other impurities, results in injury to trees and plants and in economic loss, and is a detriment to health.

Since the injury to health is due, in part, to the loss of daylight, and since the loss of daylight is a measure of the smokiness of the atmosphere, it seemed desirable to determine, as far as possible, the exact amount of light which is lost because of smoke in a large city in different seasons of the year and at different hours of the day, and also the extent to which the loss of light is affected by the height, shape, and density of the smoke layer, the humidity of the air, the velocity and direction of the wind, and by other factors.

A favorable opportunity for such a study offered itself in New York City during the year 1927, since simultaneous records of daylight could be conveniently made on the roof of the United States Marine Hospital at 67 Hudson Street, at the lower end of Manhattan Island, where the air was unusually smoky, and on the roof of a building at the United States quarantine station on Hoffman Island in lower

New York Bay, about 9 miles south of the hospital, where the air was comparatively clear. The results of this study are described in Public Health Bulletin No. 197.[1]

The instruments used were of the type which have been in use in Washington, D. C., by the United States Public Health Service for recording daylight since July, 1924. They consisted of photoelectric cells and recording potentiometers.

The photoelectric cell was placed on the roof of the building where the study was to be made, and the recording potentiometer was placed in a convenient position within the building. The platform was of such height that no shadows were cast upon the cell at any season of the year, and was also so constructed that the cell was accessible, so that its glass surface could be kept clean. The cell at Hudson Street was about 79 feet above the street level and 93 feet above mean high water. The cell on Hoffman Island was about 35 feet above the ground and 40 feet above high water.

Comparison of the results obtained at the two places showed that there was a large relative loss of light at the Hudson Street hospital due to smoke. In some cases the average hourly or daily loss was greater than 50 per cent. The average percentage loss for the whole year was 16.6 for clear days, 34.6 for cloudy days, and 21.5 for all days. The results showed that the loss of light depends, among other things, upon the altitude of the sun, upon the nature of the daylight—whether from a clear or a cloudy sky, upon the relative humidity of the air, and upon the velocity of the wind.

The effect of the altitude of the sun upon the percentage loss of light was shown clearly in the variation of the percentage loss with the hour of the day. The average percentage loss throughout the year was 30.2 at 8.30 a. m., 16.5 at 1.30 p. m., and 21 at 3.30 p. m. The average monthly percentage losses of light showed no marked seasonal effect but did show a marked relation to the average monthly relative humidities, the percentage losses usually increasing and decreasing with the relative humidities. For clear days the greatest average monthly percentage loss was 23.1 in November and the least 12.1 in May, with corresponding average relative humidities of 64.6 and 39 per cent. For cloudy days these values were 52.7 in September and 24.6 in December, with corresponding average relative humidities of 99.4 and 85.9 per cent.

Other conditions being the same, the average percentage loss of light was greater for cloudy days, or cloudy hours, than for clear days, or clear hours; the percentage loss being about 1.5 times as great for

[1] Studies in Illumination. III. A Study of the loss of light due to smoke on Manhattan Island, New York City, during the year 1927, especially in its relation to the nature of the weather, the relative humidity of the air, and the velocity and direction of the wind. By James E. Ives, physicist, United States Public Health Service.

cloudy days as for clear days for relative humidities between 40 and 80 per cent and for wind velocities between 10 and 19.9 miles per hour. For the same kind of sky, clear or cloudy, the average percentage loss of light increased with increase of relative humidity. For a clear sky the average percentage loss was twice as great for a relative humidity of 65 per cent as for 35 per cent. For a cloudy sky the increase was not so great. The percentage loss of light was also found to decrease as the velocity of the wind increased.

PUBLIC HEALTH SERVICE PUBLICATIONS

A List of Publications Issued During the Period July, 1929–June, 1930

There is printed herewith a list of publications of the United States Public Health Service issued during the period July, 1929–June, 1930.

The most important articles that appear each week in the Public Health Reports are reprinted in pamphlet form, making possible a wider and more economical distribution of information that is of especial value and interest to public-health workers and the general public.

All of the publications listed below except those marked with an asterisk (*) are available for free distribution and, as long as the supply lasts, may be obtained by addressing the Surgeon General, United States Public Health Service, Washington, D. C. Those publications marked with an asterisk are not available for free distribution but may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., *at the prices noted.* (No remittances should be sent to the Public Health Service.)

Reprints from the Public Health Reports

1296. Meningococcus meningitis and measures for its control. By G. W. McCoy. July 5, 1929. 5 pages.
1297. Studies on the biochemistry of sulphur. iii. Chemical groups involved in the naphtho-quinone reaction for cysteine and cystine. By M. X. Sullivan and W. C. Hess. July 5, 1929. 9 pages.
1298. Current studies of undulant fever. By H. E. Hasseltine. July 12, 1929. 8 pages.
1299. A study of lead poisoning in a storage-battery plant. By Leonard Greenburg, A. A. Schaye and Herman Shlionsky. July 12, 1929. 33 pages.
1300. Typhus fever in the United States. By Kenneth F. Maxcy. July 19, 1929. 8 pages.
1301. A study of the relation between mental and physical status of children in two counties of Illinois. By Grover A. Kempf and Selwyn D. Collins. July 19, 1929. 42 pages.
1302. Points to be considered in case of a poliomyelitis epidemic. By J. P. Leake. July 26, 1929. 4 pages.

1303. Economic status and the incidence of illness. Gross and specific illness rates by age and cause among persons classified according to family economic status. Hagerstown morbidity studies No. X. By Edgar Sydenstricker. July 26, 1929. 13 pages.
1304. The rôle of the vaccination dressing in the production of postvaccinal tetanus. By Charles Armstrong. August 2, 1929. 15 pages.
1305. Endemic typhus of the Southeastern United States. The reaction of the white rat. By Kenneth F. Maxcy. August 9, 1929. 9 pages.
1306. Outline of project for the study of negro health in Tennessee. By E. L. Bishop. August 9, 1929. 5 pages.
1307. Report of the departmental committee on morphine and heroin addiction to the British ministry of health. A review. By Walter L. Treadway. August 16, 1929. 6 pages.
1308. Current malaria studies with special reference to control measures. By L. L. Williams, Jr. August 16, 1929. 4 pages.
1309. Postvaccinal encephalitis. By Charles Armstrong. August 23, 1929. 4 pages.
1310. The seasonal and regional incidence of types of malaria parasites. By M. A. Barber and W. H. W. Komp. August 23, 1929. 11 pages.
1311. Cancer as a public health problem. By James Ewing. August 30, 1929. 9 pages.
1312. Differential fertility according to economic status. Live birth and still-birth rates among married women of different ages classified according to economic condition. Hagerstown morbidity studies No. XI. By Edgar Sydenstricker. August 30, 1929. 6 pages.
1313. Chloro-phenol tastes and odors in water supplies of Ohio River cities. By H. W. Streeter. September 6, 1929. 8 pages.
1314. The malaria-parasite index of school children in Leflore County, Miss. By M. A. Barber and W. H. W. Komp. September 6, 1929. 6 pages.
1315. A proposed plan for the establishment of a morbidity registration area. By R. C. Williams. September 13, 1929. 4 pages.
1316. Sickness among industrial employees during the first three months of 1929. By Dean K. Brundage. September 13, 1929. 4 pages.
1317. Experimental studies of natural purification in polluted waters. I. Apparatus and technique for the study of biochemical and other oxidations in liquids. By Emery J. Theriault and C. T. Butterfield. September 20, 1929. 16 pages.
1318. A county-wide sanitary and health survey. By Milford E. Barnes. September 27, 1929. 16 pages.
1319. Method of preparing and examining thick films for the diagnosis of malaria. By M. A. Barber and W. H. W. Komp. September 27, 1929. 12 pages.
1320. A study of rural school ventilation. The school ventilation study in Cattaragus County, N. Y., 1926–27. By Thomas J. Duffield. October 4, 1929. 28 pages.
1321. Public health service publications. A list of publications issued during the period July, 1928–June, 1929. October 4, 1929. 6 pages.
1322. Breeding places of Anopheles in the Yazoo-Mississippi Delta. By M. A. Barber and W. H. W. Komp. October 11, 1929. 6 pages.
1323. Heart disease. A public health problem. By Taliaferro Clark. October 11, 1929. 5 pages.
1324. A study of the efficiency of dust-removal systems in granite-cutting plants. By J. J. Bloomfield. October 18, 1929. 18 pages.
1325. The history of malaria in the United States. By M. A. Barber. October 25, 1929. 13 pages.

1326. The use of stearates (calcium and aluminum) as diluents for Paris green in Anopheles control. A preliminary report. By A. F. Dolloff. October 25, 1929. 8 pages.
1327. Vaccine virus pneumonia in rabbits. By Charles Armstrong and R. D. Lillie. November 1, 1929. 13 pages.
1328. Experimental studies of natural purification in polluted waters. II. Development of a suitable dilute medium. By C. T. Butterfield. November 1, 1929. 12 pages.
1329. Fatty degeneration of the liver and kidneys in the dog apparently associated with diet. A preliminary note. By W. H. Sebrell. November 8, 1929. 5 pages.
1330. Further observations on the epidemiology of narcotic drug addiction. By W. L. Treadway. November 8, 1929. 4 pages.
1331. A study of negro infant mortality. By Amanda L. Stoughton and Mary Gover. November 8, 1929. 27 pages.
1332. A study of the pellagra-preventive action of canned salmon. By Joseph Goldberger and G. A. Wheeler. November 15, 1929. 4 pages.
1333. City health officers, 1929. Directory of those in cities of 10,000 or more population. November 15, 1929. 16 pages.
1334. State and insular health authorities, 1929. Directory, with data as to appropriations and publications. November 15, 1929. 23 pages.
1335. Public health organization and administration in Hamburg, Germany. By J. G. Townsend. November 22, 1929. 20 pages.
1336. Experimental studies of natural purification in polluted waters. III. A note on the relation between food concentration in liquid media and bacterial growth. By C. T. Butterfield. November 22, 1929. 8 pages.
1337. Notes on the results of trachoma work by the Indian Service in Arizona and New Mexico. By H. J. Warner. November 29, 1929. 8 pages.
1338. Leprosy with evidences of abnormalities in carbohydrate metabolism. By N. E. Wayson, L. F. Badger, and Margaret M. Dewar. December 6, 1929. 13 pages.
1339. Cooperative rural health work of the Public Health Service in the fiscal year 1929. By L. L. Lumsden. December 6, 1922. 21 pages.
1340. Health and scholastic attainment. By H. S. Diehl. December 13, 1929. 10 pages.
1341. Whole-time county health officers, 1929. December 13, 1929. 8 pages.
1342. Observations on the treatment of leprosy in Hawaii. By N. E. Wayson. December 20, 1929. 16 pages.
1343. The legal phases of milk control. By James A. Tobey. December 20, 1929. 8 pages.
1344. The National Leper Home. (United States marine hospital) Carville, La. Review of the more important activities during the fiscal year ended June 30, 1929. By O. E. Denney. December 27, 1929. 8 pages.
1345. Report on the International Conference for the Promotion of Infant Welfare held at Stockholm, Sweden, September 19–24, 1929. By E. A. Sweet. December 27, 1929. 8 pages.
1346. Apportionment of financial aid for county health work. By Elbridge Sibley and Joseph W. Mountin. January 3, 1930. 10 pages.
1347. Sickness among industrial employees. Frequency of disability lasting longer than one week from important causes among 163,000 persons in industry in 1928 and a summary of the morbidity experience from 1920 to 1928. By Dean K. Brundage. January 17, 1930. 10 pages.
1348. A new method of evaluating the potency of antineuritic concentrates. By Maurice I. Smith. January 17, 1930. 14 pages.

1349. Acute response of guinea pigs to vapors of some new commercial organic compounds. I. Ethylene dichloride. By R. R. Sayers, W. P. Yant, C. P. Waite, and F. A. Patty. January 31, 1930. 16 pages.
1350. A study of the blacktongue preventive value of leached commercial casein, together with a test of the blacktongue preventive action of a high protein diet. By Joseph Goldberger, G. A. Wheeler, L. M. Rogers, and W. H. Sebrell. February 7, 1930. 10 pages.
1351. Will the inhalation of siliceous dusts activate a partially healed focus of tuberculous infection? An experimental study. By Leroy U. Gardner. February 7, 1930. 8 pages.
1352. Sickness among industrial employees in the second and third quarters of 1929. By Dean K. Brundage. February 14, 1930. 4 pages.
1353. History taking in the early diagnosis of pulmonary tuberculosis. By G. H. Faget. February 14, 1930. 4 pages.
1354. Corrected fatality rates in public health practice. By Howard W. Green and George W. Moorehouse. January 24, 1930. 9 pages.
1355. Influenza-pneumonia mortality in a group of about 95 cities in the United States, 1920–1929. By Selwyn D. Collins. February 21, 1930. 46 pages.
1356. Report of a case of tularaemia contracted from a coyote (Canis Lestes) in New Mexico. By G. M. Kunkel. February 28, 1930. 2 pages.
1357. The Weil-Felix reaction in endemic typhus fever and in Rocky Mountain spotted fever. By R. R. Spencer and K. F. Maxcy. February 28, 1930. 8 pages.
1358. Resistance of Paramecium to heat as affected by changes in hydrogen-ion concentration and in inorganic salt balance in surrounding medium. By H. W. Chalkley. March 7, 1930. 9 pages.
1359. Further observations on the epidemiology of narcotic drug addiction. By W. L. Treadway. March 14, 1930. 12 pages.
1360. Public health survey of Pine Bluff, Ark. By Allan J. McLaughlin. March 14, 1930. 12 pages.
1361. Public health survey of Fort Smith, Ark. By Allan J. McLaughlin. March 21, 1930. 16 pages.
1362. Recoveries from leprosy. An analysis of the records of 65 cases. By Oswald E. Denney, Ralph Hopkins, and Frederick A. Johansen. March 28, 1930. 21 pages.
1363. Filterability of the infective agent of psittacosis in birds. By Charles Armstrong, G. W. McCoy, and Sara E. Branham. April 4, 1930. 2 pages.
1364. Mental disorders and the public health. By Hugh S. Cumming. April 4, 1930. 8 pages.
1365. Seamen with venereal disease in the port of New York. A cooperative study participated in by the American Social Hygiene Association, the New York Tuberculosis and Health Association, the Welfare Council of New York City, and the United States Public Health Service. Report prepared by Annabel M. Stewart. April 11, 18, and 25, 1930. 98 pages.
1366. Psittacosis: Rickettsia-like inclusions in man and in experimental animals. By R. D. Lillie. April 11, 1930. 6 pages.
1367. Accidental psittacosis infection among the personnel of the Hygienic Laboratory. By G. W. McCoy. April 18, 1930. 2 pages.
1368. A new meningococcus-like organism (*Neisseria flavescens* n. sp.) from epidemic meningitis. By Sara E. Branham. April 18, 1930. 5 pages.

1369. Act coordinating federal public health activities. (Public, No. 106, 71st Congress; H. R. 8807.) April 25, 1930. 4 pages.
1370. Effect of radiant energy on the skin temperatures of a group of steel workers. By J. J. Bloomfield, James E. Ives, and Rollo H. Britten. May 2, 1930. 13 pages.
1371. Observations on the possibility of methyl chloride poisoning by ingestion with food and water. By W. P. Yant, H. W. Shoaf, and J. Chornyak. May 9, 1930. 8 pages.
1372. Extent of rural health service in the United States, 1926–1930. By L. L. Lumsden. May 9, 1930. 17 pages.
1373. Hearing of school children as measured by the audiometer and as related to school work. A study of 710 children in Washington, D. C., and 1,150 in Hagerstown, Md. By E. Blanche Sterling and Elizabeth Bell. May 16, 1930. 14 pages.
1374. The type distribution of meningococci in the United States during 1928 and 1929. By Sara E. Branham, Clara E. Taft, and Sadie A. Carlin. May 16, 1930. 6 pages.
1375. An anemia of dogs produced by feeding onions. By W. H. Sebrell. May 23, 1930. 17 pages.
1376. Public health administration. By Allan J. McLaughlin. May 23, 1930. 10 pages.
1377. Sickness among industrial employees during the last three months of 1929. By Dean K. Brundage. May 23, 1930. 3 pages.
1378. The abusive use of narcotic drugs in Egypt. A review. By W. L. Treadway. May 30, 1930. 3 pages.
1379. Acute response of guinea pigs to vapors of some new commercial organic compounds. II. Ethyl benzene. By W. P. Yant, H. H. Schrenk, C. P. Waite, and F. A. Patty. May 30, 1930. 9 pages.
1380. Occupational mortality as indicated in life-insurance records for the years 1915–1926. By Rollo H. Britten. May 30, 1930. 9 pages.
1381. A study of the blacktongue preventive value of lard, salt pork, dried green peas, and canned haddock. By Joseph Goldberger, G. A. Wheeler, L. M. Rogers, and W. H. Sebrell. June 6, 1930. 12 pages.
1382. *Ctenocephalides*, new genus of fleas, type *Pulex canis*. By C. W. Stiles and Benjamin J. Collins. June 6, 1930. 2 pages.
1383. Undulant fever in Ware County, Ga. By George E. Atwood and H. E. Hasseltine. June 13, 1930. 12 pages.
1384. The visible effect of castor-oil soap on certain organisms. By R. R. Spencer. June 13, 1930. 7 pages.
1385. Medical service in Federal prisons. By W. L. Treadway. June 13, 1930. 7 pages.
1386. Psittacosis outbreak in a department store. By L. F. Badger. June 20, 1930. 7 pages.
1387. The National Institute of Health, successor to the Hygienic Laboratory. June 20, 1930. 4 pages.
1388. Results of the operation of the Standard Milk Ordinance in Mississippi. By A. W. Fuchs and H. A. Kroeze. June 20, 1930. 9 pages.
1389. Acute response of guinea pigs to vapors of some new commercial organic compounds. III. "Cellosolve" (Mono-Ethyl ether of ethylene glycol). By C. P. Waite, F. A. Patty, and W. P. Yant. June 27, 1930. 7 pages.
1390. A quantitative colorimetric reaction for the ergot alkaloids and its application in the chemical standardization of ergot preparations. By Maurice I. Smith. June 27, 1930. 15 pages.

Supplements to the Public Health Reports

75. Public health laws and regulations adopted during 1927. Compiled by William Fowler. 1930. 866 pages.
76. The notifiable diseases. Prevalence during 1928 in cities of over 100,000. 1929. 37 pages.
77. The notifiable diseases. Prevalence during 1928 in cities of 10,000 to 100,000 population. 1929. 97 pages.
78. Studies on the biochemistry of sulphur. IV. The colorimetric estimation of cystine in casein by means of the beta-naphtho-quinone reaction. By M. X. Sullivan. 1929. 13 pages.
79. The notifiable diseases. Prevalence in States, 1928. 1930. 72 pages.
80. Studies in the biochemistry of sulphur. V. The cystine content of phaseolin. By M. X. Sullivan. 1929. 7 pages.
81. Some Public Health Service publications suitable for general distribution. 1929. 17 pages.
82. Studies on the biochemistry of sulphur. VI. The cystine content of conphaseolin and phaseolin, the alpha and beta globulins of the navy bean (phaseolus vulgaris). By M. X. Sullivan and D. Breese Jones. 1930. 9 pages.
83. Public health laws and regulations adopted during 1928. Compiled by William Fowler. 1930. 192 pages.
84. Court decisions relating to public health. Digest of decisions abstracted and published currently in Public Health Reports during period 1926–1929. By William Fowler. 1930. 134 pages.

Public Health Bulletins

187. The health of workers in dusty trades. II. Exposure to siliceous dust (granite industry). By A. E. Russell, R. H. Britten, L. R. Thompson, and J. J. Bloomfield. July, 1929. 206 pages.
188. Studies in natural illumination in schoolrooms. III. Effect of clouds on daylight illumination and on daylight ratios. By A. F. Beal. November, 1929. 128 pages.
189. Studies upon leprosy. XLIX. Clinical observations of "early" or moderately advanced cases. By N. E. Wayson and L. F. Badger. September, 1929. 16 pages.

*190. Rules to be observed by patients at the marine hospital for tuberculosis, Fort Stanton, New Mexico. July, 1929. 19 pages. 5 cents.

191. Transactions of the Twenty-Sixth Annual Conference of State and Territorial Health Officers with the United States Public Health Service, held at St. Paul, Minn., June 8 and 9, 1928. October, 1929. 75 pages.
192. Endemic goiter. By Robert Olesen. December, 1929. 68 pages.
193. Studies of the efficiency of water purification processes. IV. Report on a collective survey of the efficiency of a selected group of municipal water purification plants located along the Great Lakes. By H. W. Streeter. November, 1929. 100 pages.
194. Transactions of the Twenty-Seventh Annual Conference of State and Territorial Health Officers with the United States Public Health Service, held at Washington, D. C., June 3 and 4, 1929. January, 1930. 117 pages.
195. Review of carbon monoxide poisoning. By R. R. Sayers and Sara J. Davenport. March, 1930. 97 pages.
196. Transactions of the Ninth Annual Conference of State Sanitary Engineers, held at Chicago, Ill., October 13 and 15, 1928. March, 1930. 68 pages.

Hygienic Laboratory Bulletin

154. Studies on Rocky Mountain spotted fever. By R. R. Spencer and R. R. Parker. January, 1930. 116 pages.

Annual Report

Annual report of the Surgeon General of the United States Public Health Service for the fiscal year 1929. 332 pages.

Miscellaneous Publication

11. Official list of commissioned and other officers of the United States Public Health Service; also list of United States marine hospitals, quarantine, immigration, and relief stations, and quarantine vessels. July 1, 1929. 76 pages.

Unnumbered Publications

* National negro health week program. This pamphlet is published annually, usually about the middle of March, for community leaders in an effort to suggest ways and means by which interested individuals and organizations may be organized for a concerted and effective attack upon the community's disease problems. Sixteenth annual observance. 1930. 8 pages. (Out of print.)
* National negro health-week poster. Sixteenth annual observance. 1930. (Out of print.)

Reprints from Venereal Disease Information

14. Gonorrhea in the female. By Walter M. Brunet and Robert L. Dickinson. From Venereal Disease Information, Vol. X, No. 4. 21 pages.
15. Venereal disease prevalence in St. Louis. By Willard C. Smith. From Venereal Disease Information, Vol. X, No. 5. 20 pages.
16. A study of venereal disease prevalence in Mississippi. By Elizabeth V. Milovich and W. D. Riley. From Venereal Disease Information, Vol. X, No. 5. 17 pages.
17. Congenital syphilis. By Jay F. Schamberg and Carroll S. Wright. From Venereal Disease Information, Vol. X, No. 10. 20 pages.
18. Gonococcus infection in the male. By P. S. Pelouze. From Venereal Disease Information, Vol. X, No. 11. 16 pages.
19. A census of cases of syphilis and gonorrhea under treatment in Philadelphia. By Mary S. Edwards. From Venereal Disease Information, Vol. XI, No. 1. 12 pages.
20. The treatment of acute complications of gonococcus and post-gonococcus infections with calcium gluconate. By Russell D. Herrold. From Venereal Disease Information, Vol. XI, No. 2. 8 pages.
21. Can congenital syphilis be prevented? By Eugene S. Coler. From Venereal Disease Information, Vol. XI, No. 5. 8 pages.

DEATHS DURING WEEK ENDED AUGUST 9, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended August 9, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Aug. 9, 1930	Corresponding week, 1929
Policies in force	75, 893, 116	74, 576, 957
Number of death claims	12, 616	11, 861
Death claims per 1,000 policies in force, annual rate	8. 7	8. 3

Deaths [1] from all causes in certain large cities of the United States during the week ended August 9, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Aug. 9, 1930				Corresponding week, 1929		Death rate [2] for first 32 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (78 cities)	7,290	11.0	692	[4] 55	10.1	656	12.5	13.4
Akron	24	4.9	3	27	6.8	3	8.0	9.8
Albany [5]	44	18.0	3	66	12.0	1	15.4	16.8
Atlanta	72	14.0	9	95	15.3	14	16.7	16.6
White	39		4	127		8		
Colored	33	([6])	5	79	([6])	6	([6])	([6])
Baltimore [5]	218	14.1	25	85	13.0	21	14.7	15.5
White	158		18	77		19		
Colored	60	([6])	7	113	([6])	2	([6])	([6])
Birmingham	59	11.9	5	47	13.9	10	14.4	17.1
White	37		1	15		4		
Colored	22	([6])	4	95	([6])	6	([6])	([6])
Boston	181	12.0	18	51	10.0	16	14.7	16.1
Bridgeport	17	6.0	2	34	11.7	5	11.7	12.9
Buffalo	129	11.7	12	53	11.9	10	13.5	14.7
Cambridge	24	11.0	4	74	7.4	2	12.4	13.4
Camden	34	15.1	3	54	8.0	2	14.5	15.2
Canton	13	6.4	2	50	5.0	1	10.5	12.0
Chicago [5]	647	9.9	67	59	9.3	65	10.9	11.9
Cincinnati	118	13.7	10	59	14.2	9	16.1	17.9
Cleveland	169	9.8	15	45	8.5	20	11.6	13.3
Columbus	62	11.1	7	68	15.1	8	16.7	15.7
Dallas	61	12.1	14		10.1	9	12.1	12.4
White	51		12			7		
Colored	10	([6])	2		([6])	2	([6])	([6])
Dayton	30	7.8	4	59	8.7	8	10.5	12.0
Denver	79	14.3	9	94	10.4	6	14.8	15.3
Des Moines	36	13.1	3	52	9.6	2	12.3	12.1
Detroit	248	8.2	30	46	9.0	34	9.9	11.8
Duluth	24	12.4	2	54	10.3	3	11.6	11.9
El Paso	22	11.2	4		12.4	6	18.2	21.2
Erie	22	9.9	2	43	12.7	4	11.5	13.1
Fall River [5] [7]	24	10.9	2	46	10.0	3	12.9	15.1
Flint	32	10.6	6	70	5.1	6	9.5	11.1
Fort Worth	38	12.3	2		11.1	6	11.6	13.3
White	31		2			4		
Colored	7	([6])	0		([6])	2	([6])	([6])
Grand Rapids	32	9.9	5	76	9.7	0	10.9	10.5
Houston	65	11.6	9		10.8	7	12.6	13.2
White	51		9			5		
Colored	14	([6])	0		([6])	2	([6])	([6])
Indianapolis	104	14.8	5	37	12.3	11	14.9	15.2
White	80		4	35		10		
Colored	24	([6])	1	54	([6])	1	([6])	([6])
Jersey City	63	10.4	6	52	9.6	11	12.0	13.4
Kansas City, Kans	31	13.2	8	189	12.4	2	11.4	14.2
White	25		7	186		2		
Colored	6	([6])	1	217	([6])	0	([6])	([6])
Kansas City, Mo	115	15.2	3	23	12.8	7	13.9	14.6
Knoxville	35	17.1	6	141	10.1	3	14.5	14.1
White	29		6	156		3		
Colored	6	([6])	0	0	([6])	0	([6])	([6])
Los Angeles	243	10.2	22	67	12.0	23	11.4	11.8
Louisville	95	16.1	6	52	17.5	7	14.1	15.8
White	67		5	49		5		
Colored	28	([6])	1	72	([6])	2	([6])	([6])
Lowell [7]	19	9.9	2	47	8.8	1	14.2	15.3
Lynn	18	9.2	0	0	9.7	1	11.2	12.0
Memphis	73	15.1	10	119	15.6	5	18.2	19.8
White	28		5	92		2		
Colored	45	([6])	5	169	([6])	3	([6])	([6])
Milwaukee	79	7.2	6	30	8.1	7	10.2	11.7
Minneapolis	113	12.7	10	65	8.2	6	11.0	11.5

Footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended August 9, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Aug. 9, 1930				Corresponding week, 1929		Death rate [2] for first 32 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Nashville	61	21.6	13	201	16.4	12	17.9	19.9
White	44		9	185		11		
Colored	17	(6)	4	253	(6)	1	(6)	(6)
New Bedford [7]	18	8.3	2	51	11.5	3	11.6	13.5
New Haven	43	13.8	2	39	9.0	1	13.7	13.9
New Orleans	130	14.8	7	41	17.7	15	18.2	18.4
White	84		3	27		4		
Colored	46	(6)	4	67	(6)	11	(6)	(6)
New York	1,318	9.8	103	43	8.4	94	11.4	12.1
Bronx borough	174	7.1	11	26	5.5	16	8.3	8.7
Brooklyn Borough	439	8.8	39	41	7.2	32	10.3	10.9
Manhattan Borough	538	15.2	45	74	12.2	37	17.1	17.6
Queens Borough	121	5.8	7	20	6.8	7	7.4	8.0
Richmond Borough	46	15.2	1	19	11.5	2	15.0	16.4
Newark, N. J	91	10.7	6	31	11.4	9	12.7	13.6
Oakland	58	10.6	3	36	7.8	2	11.2	11.7
Oklahoma City	46	13.0	12	236	9.8	2	10.8	11.1
Omaha	62	15.1	3	31	9.3	2	14.3	14.3
Paterson	28	10.6	1	17	6.4	3	12.8	14.2
Philadelphia	405	10.7	47	70	9.5	28	13.0	13.9
Pittsburgh	158	12.3	21	77	9.2	13	14.4	15.6
Portland, Oreg	65	11.3	1	12	10.4	1	12.8	13.3
Providence	52	10.8	6	55	10.8	11	13.9	15.6
Richmond	52	14.8	5	74	14.6	4	15.6	17.4
White	30		1	22		2		
Colored	22	(6)	4	175	(6)	2	(6)	(6)
Rochester	53	8.5	5	44	10.8	4	12.0	13.1
St. Louis	207	13.1	8	26	11.6	15	15.0	15.6
St. Paul	39	7.5	2	20	9.5	4	10.5	11.0
Salt Lake City [5]	32	11.9	2	31	6.0	2	13.0	13.6
San Antonio	67	13.6	12		12.8	9	16.2	15.4
San Diego	36	12.6	2	42	11.3	2	14.7	16.1
San Francisco	114	9.5	4	27	11.3	3	13.5	13.6
Schenectady	13	7.1	1	31	7.1	1	11.6	13.1
Seattle	72	10.3	7	70	9.3	4	11.2	11.4
Somerville	19	9.5	1	33	5.6	1	10.4	9.8
Spokane	15	6.8	1	26	6.3	2	12.6	13.5
Springfield, Mass	30	10.4	4	63	8.4	2	12.7	13.3
Syracuse	43	10.8	5	62	10.4	2	12.3	13.8
Tacoma	35	17.1	0	0	9.3	0	12.9	12.2
Toledo	60	10.7	4	37	12.9	10	13.1	14.2
Trenton	36	15.3	3	56	16.2	2	17.3	18.0
Utica	34	17.3	2	57	9.7	3	15.7	16.3
Washington, D. C	133	14.2	16	93	10.3	7	15.8	16.2
White	75		5	43		4		
Colored	58	(6)	11	195	(6)	3	(6)	(6)
Waterbury	19	9.8	3	77	6.2	4	10.2	10.1
Wilmington, Del.[7]	32	15.9	2	45	7.4	4	15.0	14.6
Worcester	42	11.1	4	52	9.4	4	13.4	13.3
Yonkers	24	9.2	4	96	10.2	3	8.4	9.5
Youngstown	36	11.0	7	110	8.8	3	10.5	12.6

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended August 16, 1930, and August 17, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 16, 1930, and August 17, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929
New England States:								
Maine	-------	2	1	1	2	8	0	0
New Hampshire	-------	2	-------	-------	1	5	0	0
Vermont	-------	1	-------	-------	-------	2	0	0
Massachusetts	44	31	1	3	55	31	1	4
Rhode Island	-------	3	-------	-------	2	5	0	-------
Connecticut	4	15	-------	4	11	8	0	1
Middle Atlantic States:								
New York	48	80	-------	[1] 10	39	79	18	19
New Jersey	37	57	-------	4	33	19	7	2
Pennsylvania	40	56	-------	-------	129	76	8	17
East North Central States:								
Ohio	32	17	7	-------	49	36	4	4
Indiana	6	15	-------	-------	5	10	1	7
Illinois	56	98	3	3	16	81	6	15
Michigan	29	45	-------	2	46	57	16	6
Wisconsin	17	19	4	-------	66	57	4	1
West North Central States:								
Minnesota	6	4	4	-------	3	10	3	1
Iowa	2	4	-------	-------	-------	7	1	0
Missouri	8	6	-------	2	9	6	2	3
North Dakota	2	8	-------	-------	5	13	3	1
South Dakota	7	-------	-------	-------	3	2	0	0
Nebraska	2	5	1	-------	7	29	0	1
Kansas	7	18	-------	2	14	27	1	0
South Atlantic States:								
Delaware	2	3	-------	-------	3	1	0	0
Maryland [2]	9	7	4	1	7	6	0	1
District of Columbia	3	8	-------	2	6	2	0	0
Virginia	-------	-------	-------	-------	-------	-------	-------	-------
West Virginia	8	13	2	10	12	43	0	1
North Carolina	54	52	-------	-------	7	2	4	2
South Carolina	18	8	29	48	5	-------	0	0
Georgia	-------	21	10	6	6	5	1	1
Florida	4	11	-------	-------	2	1	3	0
East South Central States:								
Kentucky	-------	4	-------	-------	-------	-------	0	1
Tennessee	3	21	1	14	4	4	0	0
Alabama	15	25	6	6	15	7	3	1
Mississippi	9	16	-------	-------	-------	-------	1	-------

[1] New York City only.
[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 16, 1930, and August 17, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929
West South Central States:								
Arkansas	-------	1	4	3	-------	1	0	0
Louisiana	12	20	10	3	11	3	0	1
Oklahoma [3]	3	12	8	10	4	2	1	0
Texas	15	46	-------	-------	7	5	2	0
Mountain States:								
Montana	1	3	-------	-------	4	10	0	0
Idaho	-------	-------	1	-------	-------	3	0	0
Wyoming	-------	1	-------	-------	-------	2	0	0
Colorado	2	4	-------	-------	12	5	2	0
New Mexico	8	7	-------	-------	2	1	0	1
Arizona	2	1	-------	-------	9	2	0	3
Utah [1]	-------	1	-------	3	1	1	2	0
Pacific States:								
Washington	7	5	-------	-------	26	15	4	3
Oregon	2	7	1	1	15	-------	0	2
California	42	38	-------	9	85	28	3	9

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929
New England States:								
Maine	2	0	5	4	0	0	3	4
New Hampshire	0	0	3	2	0	0	0	0
Vermont	0	0	2	-------	0	1	0	13
Massachusetts	25	0	45	45	0	0	21	9
Rhode Island	2	0	3	5	0	-------	1	1
Connecticut	1	0	5	7	0	0	0	3
Middle Atlantic States:								
New York	48	32	49	51	1	2	28	36
New Jersey	3	5	16	30	0	0	16	9
Pennsylvania	9	14	62	67	0	0	56	37
East North Central States:								
Ohio	19	4	71	30	7	32	45	38
Indiana	4	1	17	17	13	25	12	8
Illinois	14	1	56	58	29	11	39	30
Michigan	6	9	41	70	20	27	8	7
Wisconsin	1	0	24	29	2	6	7	1
West North Central States:								
Minnesota	25	1	13	23	2	1	2	3
Iowa	2	1	1	8	4	10	1	25
Missouri	6	2	9	10	7	4	35	11
North Dakota	0	0	7	8	13	2	3	1
South Dakota	4	0	0	2	3	9	9	6
Nebraska	1	0	3	12	8	2	4	1
Kansas	17	1	6	17	12	2	26	14
South Atlantic States:								
Delaware	0	0	1	-------	0	0	7	0
Maryland [1]	1	1	8	28	0	0	65	24
District of Columbia	0	0	4	3	0	0	5	1
Virginia	-------	10	-------	-------	-------	-------	-------	-------
West Virginia	1	1	13	17	1	0	39	16
North Carolina	2	5	34	41	3	2	68	38
South Carolina	0	0	9	10	0	0	41	21
Georgia	2	0	7	12	0	0	50	51
Florida	0	2	3	8	0	0	6	2
East South Central States:								
Kentucky	0	0	4	26	13	11	50	39
Tennessee	0	7	7	8	0	0	104	86
Alabama	0	3	13	8	0	1	32	35
Mississippi	3	2	9	7	0	0	28	39
West South Central States:								
Arkansas	3	0	1	6	0	12	34	26
Louisiana	20	1	3	4	0	0	56	28
Oklahoma [3]	14	2	5	10	3	1	52	64
Texas	5	0	9	24	53	6	35	48

[1] Week ended Friday.

[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 16, 1930, and August 17, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929	Week ended Aug. 16, 1930	Week ended Aug. 17, 1929
Mountain States:								
Montana	0	1	9	7	1	1	2	2
Idaho	1	0	0		2	4	0	1
Wyoming	0	0	4	1	0	0	0	0
Colorado	6	0	7	4	0	1	10	7
New Mexico	1	0	2	1	1	0	5	5
Arizona	1	0	3	2	0	0	4	0
Utah [1]	0	0	3	1	0	1	2	0
Pacific States:								
Washington	1	0	14	12	10	21	3	8
Oregon	2	1	4	4	1	17	8	2
California	51	7	27	57	5	13	18	24

[1] Week ended Friday.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Cerebrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May, 1930										
Florida		22	6	33	890	6	2	13	5	10
June, 1930										
Delaware		3	1		18		0	26	0	1
Florida		24	1	36	216	12	0	4	2	14
Montana		2			81		3	67	17	6
July, 1930										
District of Columbia	1	31	2		107	1		15	0	10
Florida	2	28	4	112	20	5	0	7	2	19
Georgia	4	17	20	421	97	62	1	21	4	248
Maryland	2	48	8	2	55	1	3	56	0	75
Massachusetts	4	134	4	5	1,207		26	231	0	16
New Hampshire		2					2	9	0	
New Jersey	16	226	6	2	1,250		4	116	0	23
New York	42	329		10	2,795		46	400	43	95
Ohio	14	121	20	21	464		26	316	152	108
Porto Rico		23	23	631	31	1	0		0	49
Tennessee	21	18	28	420	124	51	4	51	37	296
Vermont		9			30		0	13	0	
Wisconsin	8	43	14		677		2	141	55	5

May, 1930	Cases
Florida:	
Chicken pox	126
Mumps	359
Typhus fever	1
Whooping cough	13

June, 1930	
Chicken pox:	
Delaware	18
Florida	16
Montana	21
Dengue:	
Florida	1
Dysentery:	
Florida	3
Mumps:	
Delaware	3
Florida	71
Montana	46
Paratyphoid fever:	
Florida	1
Rocky Mountain spotted or tick fever:	
Montana	5
Septic sore throat:	
Montana	2
Typhus fever:	
Florida	2
Undulant fever:	
Montana	1
Vincent's angina:	
Montana	1
Whooping cough:	
Delaware	17
Florida	16
Montana	50

July, 1930	Cases
Anthrax:	
New York	1
Porto Rico	1
Chicken pox:	
District of Columbia	15
Georgia	21
Maryland	71
Massachusetts	273
New Jersey	137
New York	604
Ohio	488
Tennessee	6
Vermont	21
Wisconsin	389
Conjunctivitis:	
Georgia	2
Diarrhea:	
Maryland	102
Diarrhea and enteritis (under 2 years):	
Ohio	44
Dysentery:	
Georgia	55
Maryland	84
Massachusetts	3
New Jersey	1
New York	7
Ohio	3
Porto Rico	17
Tennessee	83
Filariasis:	
Porto Rico	3
Food poisoning:	
Ohio	5
German measles:	
Maryland	19
Massachusetts	94
New Jersey	65
New York	258
Ohio	5
Wisconsin	78
Hookworm disease:	
Georgia	23
Impetigo contagiosa:	
Maryland	3
Tennessee	4
Lead poisoning:	
Massachusetts	4
New Jersey	12
Ohio	10
Lethargic encephalitis:	
Maryland	3
Massachusetts	1
New Jersey	1
New York	7
Ohio	4
Tennessee	4
Wisconsin	2
Mumps:	
Florida	5
Georgia	35
Maryland	42
Massachusetts	178
New Jersey	99
New York	507
Ohio	128
Porto Rico	12
Tennessee	13
Vermont	3
Wisconsin	203
Ophthalmia neonatorum:	
Maryland	1
Massachusetts	86
New Jersey	3
New York	9
Ohio	114
Porto Rico	4
Tennessee	1
Wisconsin	4
Paratyphoid fever:	
Georgia	4
New York	5
Ohio	2
Puerperal fever:	
New York	7
Ohio	3
Porto Rico	6
Tennessee	1
Rabies in animals:	
Maryland	3
New York	15
Rabies in man:	
Massachusetts	1
Ohio	1
Tennessee	1
Scabies:	
Maryland	1

	Cases
Septic sore throat:	
Georgia	14
Maryland	3
Massachusetts	17
New York	125
Ohio	28
Tetanus:	
Georgia	1
Maryland	1
Massachusetts	4
New Jersey	3
New York	20
Ohio	4
Porto Rico	7
Tetanus (infantile):	
Porto Rico	11
Trachoma:	
Georgia	1
Massachusetts	5
New York	2
Ohio	6
Tennessee	15
Wisconsin	1
Tularaemia:	
Georgia	1
Typhus fever:	
Dist. of Columbia	2
Florida	1
Georgia	8

	Cases
Typhus fever—Continued.	
Maryland	10
New Jersey	1
New York	3
Undulant fever:	
Georgia	2
Maryland	4
Massachusetts	1
New York	12
Ohio	10
Tennessee	3
Wisconsin	3
Vincent's angina:	
Maryland	6
New York	69
Tennessee	2
Whooping cough:	
Dist. of Columbia	47
Florida	3
Maryland	226
Massachusetts	680
New Jersey	339
New York	1,509
Ohio	664
Porto Rico	47
Tennessee	71
Vermont	46
Wisconsin	855

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 93 cities reporting cases used in the following tables are situated in all parts of the country and have an estimated aggregate population of more than 31,285,000. The estimated population of the 87 cities reporting deaths is more than 29,695,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended August 9, 1930, and August 10, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	572	902	
93 cities	231	370	427
Measles:			
45 States	1,109	944	
93 cities	306	180	
Meningococcus meningitis:			
46 States	94	115	
93 cities	52	56	
Poliomyelitis:			
47 States	256	109	
Scarlet fever:			
46 States	613	894	
93 cities	194	260	245
Smallpox:			
46 States	254	229	
93 cities	15	31	14
Typhoid fever:			
46 States	967	802	
93 cities	100	95	153
Deaths reported			
Influenza and pneumonia:			
87 cities	322	303	
Smallpox:			
87 cities	0	0	

City reports for week ended August 9, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	1	1	0	----------	0	0	3	1
New Hampshire:								
Concord	0	0	0	----------	0	0	0	0
Vermont:								
Barre	0	0	0	----------	0	1	4	0
Burlington	0	0	0	----------	0	2	0	0
Massachusetts:								
Boston	4	20	9	----------	0	30	11	11
Fall River	3	2	0	----------	0	2	0	0
Springfield	1	1	0	----------	0	0	0	1
Worcester	0	3	1	----------	0	1	0	0
Rhode Island:								
Pawtucket	0	0	0	----------	0	0	0	3
Providence	2	3	4	----------	0	6	0	1
Connecticut:								
Bridgeport	0	2	0	----------	0	0	0	1
Hartford	0	2	0	----------	0	1	0	1
New Haven	0	1	0	----------	0	0	2	0
MIDDLE ATLANTIC								
New York:								
Buffalo	0	8	2	----------	0	4	1	10
New York	14	97	44	3	4	77	17	76
Rochester	----------	2	----------	----------	----------	----------	----------	----------
Syracuse	4	2	0	----------	0	5	2	2
New Jersey:								
Camden	1	2	2	----------	0	7	0	2
Newark	1	7	11	1	0	1	9	3
Trenton	0	1	0	----------	0	1	0	2
Pennsylvania:								
Philadelphia	9	29	6	----------	0	22	19	21
Pittsburgh	3	12	6	----------	1	18	2	5
Reading	0	0	0	----------	0	0	1	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	2	3	1	----------	0	2	0	8
Cleveland	18	18	6	5	0	4	11	7
Columbus	2	2	3	----------	0	1	0	1
Toledo	0	4	0	----------	0	0	0	2
Indiana:								
Fort Wayne	0	1	1	----------	0	0	0	1
Indianapolis	0	3	4	----------	0	0	0	13
South Bend	0	1	0	----------	0	0	0	0
Terre Haute	0	1	0	----------	0	0	0	1
Illinois:								
Chicago	16	53	47	----------	1	2	15	21
Springfield	0	0	0	----------	0	0	0	0
Michigan:								
Detroit	3	25	9	----------	0	16	9	14
Flint	3	2	0	----------	0	11	0	2
Grand Rapids	2	1	4	----------	0	1	1	1
Wisconsin:								
Kenosha	1	0	0	----------	0	0	3	0
Madison	0	0	0	----------	----------	1	0	----------
Milwaukee	0	7	1	----------	0	7	0	6
Racine	0	1	1	----------	0	0	0	0
Superior	2	0	0	----------	0	0	0	0

City reports for week ended August 9, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0	----------	0	0	0	1
Minneapolis	3	10	2	----------	1	2	0	0
St. Paul	2	5	1	----------	0	1	1	0
Iowa:								
Davenport	1	0	0	----------	0	0	0	0
Des Moines	0	1	0	----------	0	0	0	0
Sioux City	0	0	0	----------	----------	0	0	----------
Waterloo	0	0	0	----------	----------	0	0	----------
Missouri:								
Kansas City	2	1	2	----------	0	4	0	5
St. Joseph	0	0	1	----------	0	0	0	2
St. Louis	3	15	7	----------	----------	13	3	----------
North Dakota:								
Fargo	0	0	0	----------	0	1	5	0
Grand Forks	0	0	0	----------	0	0	0	0
South Dakota:								
Aberdeen	2	0	0	----------	0	1	0	0
Sioux Falls	0	0	0	----------	0	0	0	0
Nebraska:								
Omaha	2	2	2	----------	0	2	1	5
Kansas:								
Topeka	0	1	0	----------	0	1	2	1
Wichita	----------	0	----------	----------	----------	----------	----------	----------
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	0	0	----------	0	0	0	4
Maryland:								
Baltimore	8	10	2	----------	1	0	2	13
Cumberland	0	0	0	----------	0	0	0	0
Frederick	0	0	0	----------	0	0	0	0
District of Columbia:								
Washington	1	5	3	----------	0	5	0	6
Virginia:								
Lynchburg	1	1	0	----------	0	0	0	0
Norfolk	0	0	0	----------	0	3	0	2
Richmond	0	3	1	----------	2	1	0	0
Roanoke	0	0	0	----------	1	0	0	1
West Virginia:								
Charleston	1	0	1	----------	0	1	3	2
Wheeling	1	0	0	----------	0	0	0	0
North Carolina:								
Raleigh	0	1	0	----------	0	0	0	0
Wilmington	0	0	1	----------	0	0	0	1
Winston-Salem	0	1	0	----------	0	0	3	1
South Carolina:								
Charleston	0	0	0	1	0	0	0	1
Columbia	0	0	0	----------	0	0	0	1
Georgia:								
Atlanta	0	3	1	1	0	0	1	3
Brunswick	0	0	0	----------	0	0	0	1
Savannah	0	0	0	----------	0	0	2	2
Florida:								
Miami	1	1	0	1	0	0	0	3
St. Petersburg	0	0	0	----------	0	0	0	0
Tampa	1	1	0	----------	1	5	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0	----------	0	1	0	0
Tennessee:								
Memphis	----------	2	----------	----------	----------	----------	----------	----------
Nashville	0	2	2	----------	0	1	0	2
Alabama:								
Birmingham	0	2	1	----------	0	1	0	2
Mobile	0	0	0	----------	0	0	0	1
Montgomery	0	0	0	----------	----------	0	0	----------

City reports for week ended August 9, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0			0	0	
Little Rock	0	0	1		0	0	0	0
Louisiana:								
New Orleans	0	5	1		0	1	0	6
Shreveport	0	0	0		0	0	0	0
Oklahoma:								
Tulsa	0	1	1		0	0	0	0
Texas:								
Dallas	0	4	5		0	2	0	1
Fort Worth	0	1	0		0	0	0	3
Galveston	0	0	0		0	0	0	0
Houston		2						
San Antonio	0	1	5		0	0	1	5
MOUNTAIN								
Montana:								
Billings	0	0	0		0	1	0	0
Great Falls	0	0	0		0	1	1	0
Helena	0	0	0		0	0	0	0
Missoula	1	0	0		0	0	0	0
Idaho:								
Boise	1	0	0		0	0	0	0
Colorado:								
Denver	1	7	2		1	2	2	7
Pueblo	3	1	0		0	4	1	0
New Mexico:								
Albuquerque	0	0	1		0	0	0	0
Arizona:								
Phoenix	0	0	0		0	0	0	0
Utah:								
Salt Lake City	2	2	0		1	5	3	1
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	8	1	2			5	11	
Spokane	1	1	0	3		2	0	
Tacoma	0	1	8		0	4	0	2
Oregon:								
Portland	2	4	2		0	3	3	3
California:								
Los Angeles	5	23	16	4	2	16	19	8
Sacramento	0	1	0		0	2	0	0
San Francisco	6	8	2		0	2	2	4

City reports for week ended August 9, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
NEW ENGLAND											
Maine:											
Portland	0	1	0	0	0	0	1	0	0	6	18
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	4
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	1	0
Burlington	0	0	0	0	0	0	0	0	0	0	5
Massachusetts:											
Boston	15	8	0	0	0	11	3	1	0	41	181
Fall River	0	1	0	0	0	3	1	0	0	2	24
Springfield	1	0	0	0	0	2	1	1	0	4	34
Worcester	2	5	0	0	0	1	0	0	0	2	42
Rhode Island:											
Pawtucket	0	0	0	0	0	1	0	0	0	0	13
Providence	2	3	0	0	0	1	1	0	0	23	52
Connecticut:										0	17
Bridgeport	2	1	0	0	0	1	1	0	0		
Hartford	1	0	0	0	0	2	1	0	0	2	29
New Haven	0	0	0	0	0	2	1	0	0	0	43
MIDDLE ATLANTIC											
New York:											
Buffalo	5	2	0	0	0	7	1	0	0	32	128
New York	27	14	0	0	0	111	33	19	1	147	1,316
Rochester	4	------	0	------	------	------	1	------	------	------	------
Syracuse	2	2	0	0	0	2	0	1	0	26	43
New Jersey:											
Camden	1	0	0	0	0	1	1	1	1	0	35
Newark	4	1	0	0	0	8	1	0	0	21	92
Trenton	0	1	0	0	0	1	1	0	0	9	36
Pennsylvania:											
Philadelphia	15	11	0	0	0	30	7	0	0	0	405
Pittsburgh	7	8	0	0	0	0	2	0	0	33	158
Reading	0	0	0	0	0	1	0	0	0	9	17
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	5	0	2	0	13	2	2	0	0	118
Cleveland	9	10	0	0	0	16	4	3	2	63	169
Columbus	2	1	0	0	0	5	0	0	0	2	72
Toledo	2	4	1	0	0	2	2	2	0	2	61
Indiana:											
Fort Wayne	1	1	0	0	0	1	0	1	0	1	20
Indianapolis	2	1	1	4	0	4	1	0	0	21	------
South Bend	0	1	0	0	0	1	0	0	0	0	13
Terre Haute	0	1	0	0	0	1	1	0	0	0	28
Illinois:											
Chicago	27	27	0	2	0	45	5	1	0	77	647
Springfield	0	0	0	0	0	0	0	0	0	0	22
Michigan:											
Detroit	23	10	1	0	0	27	5	3	2	120	248
Flint	4	2	0	1	0	1	0	0	0	8	32
Grand Rapids	2	2	0	0	0	0	0	------	0	5	31
Wisconsin:											
Kenosha	0	2	0	0	0	0	0	0	0	20	5
Madison	0	0	0	0	------	------	0	0	------	15	------
Milwaukee	6	5	1	0	0	7	1	0	0	94	79
Racine	1	3	0	0	0	0	0	1	0	18	10
Superior	1	2	0	0	0	1	0	7	0	1	9

City reports for week ended August 9, 1930—**Continued**

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
WEST NORTH CENTRAL											
Minnesota:											
Duluth	3	0	0	0	0	1	0	0	0	8	24
Minneapolis	11	0	0	0	0	2	2	1	0	1	113
St. Paul	6	1	1	0	0	1	1	0	0	5	42
Iowa:											
Davenport	0	2	0	7			0	0			
Des Moines	2	1	0	5			0	0			36
Sioux City	0	0	0	1			0	0		0	
Waterloo	0	0	0	1			0	0		0	
Missouri:											
Kansas City	2	8	0	0	0	7	2	2	0	20	115
St. Joseph	0	2	0	0	0	2	0	0	0	8	34
St. Louis	7	3	0	0	0	6	6	3	1	7	207
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	3	7
Grand Forks	0	0	0	0	0	0	0	0	0	0	
South Dakota:											
Aberdeen	0	0	0	0	0	0	0	0	0	3	
Sioux Falls	1	0	0	2	0	0	0	0	0	0	5
Nebraska:											
Omaha	1	0	0	0	0	2	1	4	2	0	62
Kansas:											
Topeka	1	0	0	0	0	0	0	0	0	3	23
Wichita	2		0				0				
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	0	0	0	0	3	0	1	0	0	32
Maryland:											
Baltimore	5	2	0	0	0	16	8	4	1	22	218
Cumberland	0	0	0	0	0	1	1	1	0	0	12
Frederick	0	0	0	0	0	0	0	0	0	0	2
District of Columbia:											
Washington	3	1	1	0	0	12	4	2	0	6	133
Virginia:											
Lynchburg	0	1	0	0	0	2	1	2	0	0	6
Norfolk	0	1	0	0	0	0	1	0	0	0	
Richmond	2	1	0	0	0	2	2	0	1	1	54
Roanoke	1	0	0	0	0	0	1	1	0	2	16
West Virginia:											
Charleston	0	0	0	0	0	0	2	4	0	8	22
Wheeling	1	0	0	0	0	1	0	0	0	0	17
North Carolina:											
Raleigh	0	0	0	0	0	3	0	0	0	2	12
Wilmington	0	1	0	0	0	0	0	1	0	10	16
Winston-Salem	1	1	0	0	0	0	2	2	0	2	13
South Carolina:											
Charleston	0	0	0	0	0	1	2	1	0	0	21
Columbia	0	0	0	0	0	1	1	0	0	2	9
Georgia:											
Atlanta	2	2	0	1	0	4	4	6	0	3	72
Brunswick	0	0	0	0	0	0	0	2	0	0	4
Savannah	0	0	0	0	0	1	1	0	0	1	28
Florida:											
Miami	0	0	0	0	0	0	1	0	0	0	19
St. Petersburg	0	0	0	0	0	0	0	0	0	0	10
Tampa	0	1	0	0	0	1	1	6	0	2	24
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	0	0	0	0	0	0	1	0	0	17
Tennessee:											
Memphis	1		1				7				
Nashville	1	0	1	0	0	4	6	2	0	0	61
Alabama:											
Birmingham	1	0	0	0	0	4	5	1	0	0	50
Mobile	0	2	0	0	0	1	1	1	0	0	25
Montgomery	0	0	0	0			1	1		0	

City reports for week ended August 9, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	----	----	0	0	----	0	----
Little Rock	0	0	0	0	0	3	1	0	0	0	0
Louisiana:											
New Orleans	2	4	1	0	0	9	5	1	1	4	130
Shreveport	0	0	0	0	0	0	2	0	0	0	24
Oklahoma:											
Tulsa	0	1	0	0	0	0	2	0	0	3	----
Texas:											
Dallas	2	2	0	0	0	3	4	0	0	0	61
Fort Worth	1	0	0	0	0	5	1	0	0	0	38
Galveston	0	0	0	0	0	0	1	0	0	0	15
Houston	1	----	0	----	----	----	1	----	----	----	----
San Antonio	0	4	0	1	0	5	1	0	0	0	67
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	1	0	0	0	0	8
Great Falls	0	2	0	0	0	0	0	0	0	2	6
Helena	0	0	0	0	0	0	0	0	0	0	5
Missoula	0	1	0	0	0	1	0	0	0	1	3
Idaho:											
Boise	0	1	0	0	0	1	0	1	0	0	5
Colorado:											
Denver	2	4	0	0	0	5	1	2	0	34	79
Pueblo	1	0	0	0	0	0	0	0	0	3	18
New Mexico:											
Albuquerque	0	0	0	0	0	4	0	0	0	0	10
Arizona:											
Phoenix	0	0	0	0	0	0	0	0	0	0	----
Utah:											
Salt Lake City	1	0	0	0	0	1	1	1	0	31	32
Nevada:											
Reno	0	0	0	0	0	1	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	2	5	1	0	----	----	1	2	----	14	----
Spokane	1	0	0	2	----	----	0	0	----	6	----
Tacoma	1	4	1	0	0	0	0	0	0	1	----
Oregon:											
Portland	1	0	4	2	0	3	1	1	0	0	65
California:											
Los Angeles	9	7	3	0	0	33	8	2	----	29	243
Sacramento	1	0	1	0	0	2	1	1	0	1	15
San Francisco	5	3	0	0	0	9	2	0	0	8	140

City reports for week ended August 9, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	2	0
Massachusetts:									
Boston	0	0	0	0	0	0	1	7	0
Rhode Island:									
Providence	0	0	0	0	0	0	0	1	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	1	0	0	0	0	0	9	0
New York	17	8	1	4	0	0	15	5	0
Syracuse	0	0	0	0	0	0	0	5	1
New Jersey:									
Newark	1	0	0	0	0	0	1	0	0
Pennsylvania:									
Philadelphia	4	1	1	1	0	0	0	0	0
Pittsburgh	1	1	0	0	0	0	0	1	1
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	2	0	0	0	0	0	0	0	0
Cleveland	1	1	0	0	0	0	1	1	0
Toledo	0	0	0	0	0	0	0	1	0
Indiana:									
Indianapolis	1	0	0	0	0	0	0	0	0
Illinois:									
Chicago	4	2	0	2	0	1	2	5	2
Michigan:									
Detroit	6	4	0	0	0	0	1	2	2
Flint	0	1	0	0	0	0	0	0	0
Wisconsin:									
Kenosha	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	1	0
Minneapolis	2	0	0	0	0	0	0	0	0
Iowa:									
Des Moines	1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	4	2	0	0	0	0	1	7	0
St. Louis	2	2	1	0	0	0	0	2	0
North Dakota:									
Fargo	0	0	0	0	0	0	1	1	0
SOUTH ATLANTIC [1]									
Maryland:									
Baltimore [1]	0	0	0	1	0	0	2	0	0
Virginia:									
Norfolk	0	0	0	0	0	0	0	4	1
North Carolina:									
Raleigh	0	0	0	0	2	0	0	0	0
Wilmington	0	0	0	0	2	0	0	0	0
Winston-Salem	0	0	0	0	5	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	3	0	0	0	0
Georgia: [1]									
Atlanta	0	0	0	0	2	1	0	0	0
Brunswick	0	0	0	0	0	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Nashville	3	2	0	0	0	0	0	0	0
Alabama:									
Birmingham	0	0	0	0	1	0	0	0	1
Mobile	0	0	0	0	1	0	0	0	0
Montgomery	0	0	0	0	3	0	0	0	0

[1] Typhus fever, 10 cases: 1 case at Baltimore, Md., 2 cases at Washington, D. C., 3 cases at Savannah, Ga., 4 cases at Tampa, Fla.

City reports for week ended August 9, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	1	1	0	1	1
Oklahoma:									
Tulsa	0	0	0	0	0	0	0	1	0
Texas:									
Dallas	0	0	0	0	5	3	0	0	0
MOUNTAIN									
Idaho:									
Boise	1	1	0	0	0	0	0	0	0
Colorado:									
Pueblo	0	0	0	1	0	0	0	0	0
Utah:									
Salt Lake City	2	1	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	0	0	0	0	0	0	1	1	0
California:									
Los Angeles	1	1	0	0	1	0	1	21	0
San Francisco	0	0	0	1	0	1	0	3	1

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended August 9, 1930, compared with those for a like period ended August 10, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, July 6 to August 9, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929
98 cities	59	88	[2] 49	73	38	68	[3] 40	67	[4] 38	[5] 63
New England	38	79	33	83	22	58	33	54	31	45
Middle Atlantic	52	99	48	76	35	75	35	67	[6] 35	70
East North Central	87	119	66	105	49	103	[7] 49	99	48	81
West North Central	66	69	38	54	34	21	[8] 35	25	[9] 30	31
South Atlantic	29	43	[10] 43	30	35	28	37	47	16	30
East South Central	27	41	13	27	27	27	7	34	[11] 27	[5] 30
West South Central	64	84	[12] 38	69	34	99	37	95	[13] 54	118
Mountain	26	26	69	17	69	9	34	9	17	35
Pacific	61	41	38	41	33	31	[14] 65	46	66	43

MEASLES CASE RATES

	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929
98 cities	257	150	[2] 151	98	107	69	[3] 69	49	[4] 51	[5] 30
New England	421	186	235	146	175	101	97	97	91	31
Middle Atlantic	322	51	205	47	152	27	91	35	[6] 67	15
East North Central	155	351	71	210	60	149	[7] 34	84	28	58
West North Central	127	104	57	52	63	58	[8] 39	38	[9] 47	33
South Atlantic	130	49	[10] 114	43	46	17	55	11	22	9
East South Central	202	14	47	7	61	7	40	7	[11] 27	[5] 7
West South Central	19	61	[12] 11	4	7	27	11	8	[13] 14	19
Mountain	566	104	240	61	172	70	154	26	112	61
Pacific	502	152	361	109	191	77	[14] 159	43	73	24

SCARLET FEVER CASE RATES

	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929
98 cities	72	83	[2] 54	64	50	59	[3] 39	40	[4] 32	[5] 44
New England	66	83	60	56	66	56	55	63	42	52
Middle Atlantic	51	41	37	35	36	19	22	24	[6] 19	23
East North Central	115	160	87	103	76	110	[7] 50	62	46	72
West North Central	83	79	42	54	30	77	[8] 49	35	[9] 28	44
South Atlantic	62	64	[10] 45	69	37	60	40	28	18	41
East South Central	47	48	20	55	54	27	7	34	[11] 18	[5] 15
West South Central	37	42	[12] 23	72	49	57	56	38	[13] 45	42
Mountain	86	35	77	78	26	26	60	9	69	44
Pacific	50	89	57	65	45	65	[14] 46	48	45	56

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1930, and 1929, respectively.
[2] Columbia, S. C., and Fort Smith, Ark., not included.
[3] Fort Wayne, Ind., Sioux City, Iowa, and San Francisco, Calif., not included.
[4] Rochester, N. Y., Wichita, Kans., Memphis, Tenn., and Houston, Tex., not included.
[5] Montgomery, Ala., not included.
[6] Rochester, N. Y., not included.
[7] Fort Wayne, Ind., not included.
[8] Sioux City, Iowa, not included.
[9] Wichita, Kans., not included.
[10] Columbia, S. C., not included.
[11] Memphis, Tenn., not included.
[12] Fort Smith, Ark., not included.
[13] Houston, Tex., not included.
[14] San Francisco, Calif., not included.

Summary of weekly reports from cities, July 6 to August 9, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

SMALLPOX CASE RATES

	Week ended—									
	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929
98 cities	7	8	[2] 6	13	7	8	[3] 3	7	[4] 2	[5] 5
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	[6] 0	0
East North Central	9	19	10	32	8	16	[7] 2	13	6	12
West North Central	9	15	13	21	21	21	[8] 12	6	[9] 4	10
South Atlantic	0	2	[10] 4	2	2	0	4	0	2	0
East South Atlantic	20	7	0	7	20	7	0	7	[11] 0	[5] 7
West South Central	7	15	[12] 8	0	4	8	15	4	[13] 5	0
Mountain	9	35	17	44	17	9	0	26	0	0
Pacific	43	10	21	34	26	22	[14] 20	34	5	17

TYPHOID FEVER CASE RATES

	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929
98 cities	16	14	[2] 15	18	18	18	[3] 18	19	[4] 17	[5] 17
New England	4	4	9	9	7	29	7	11	4	13
Middle Atlantic	10	7	4	10	7	7	5	11	[6] 10	11
East North Central	6	7	9	8	13	8	[7] 12	10	11	11
West North Central	9	10	23	19	47	13	[8] 23	33	[9] 20	15
South Atlantic	55	7	[10] 37	32	38	37	48	22	60	22
East South Central	94	157	67	144	74	103	121	150	[11] 54	[5] 45
West South Central	37	84	[12] 61	57	41	69	45	53	[13] 5	61
Mountain	0	9	26	52	17	44	26	9	34	9
Pacific	17	2	19	5	12	7	[14] 23	19	12	29

INFLUENZA DEATH RATES

	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929
91 cities	4	3	[10] 3	3	3	3	[15] 1	3	[4] 3	1
New England	0	2	0	0	0	2	0	0	0	0
Middle Atlantic	4	2	3	2	1	2	0	2	[6] 2	1
East North Central	3	3	2	3	3	4	[7] 1	4	1	1
West North Central	6	0	0	3	3	3	0	0	[9] 3	6
South Atlantic	2	4	[10] 0	6	4	4	5	4	9	0
East South Central	15	7	0	0	0	0	0	15	[11] 0	0
West South Central	8	4	11	20	11	4	0	8	[13] 0	0
Mountain	0	26	9	0	0	9	0	9	17	0
Pacific	3	0	6	3	3	0	[14] 5	0	6	0

PNEUMONIA DEATH RATES

	July 12, 1930	July 13, 1929	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929
91 cities	54	55	[10] 44	55	57	49	[15] 54	54	[4] 54	53
New England	40	29	35	70	40	31	38	43	42	38
Middle Atlantic	57	62	56	65	72	57	62	61	[6] 61	60
East North Central	38	50	32	40	38	38	[7] 44	47	47	43
West North Central	74	51	38	36	56	51	47	39	[9] 44	45
South Atlantic	55	58	[10] 47	54	79	60	60	51	66	41
East South Central	81	30	59	52	103	52	59	75	[11] 51	60
West South Central	84	82	50	27	77	86	61	78	[13] 56	121
Mountain	103	44	51	96	77	61	60	61	69	61
Pacific	61	53	18	63	9	25	[14] 57	50	43	41

[2] Columbia, S. C., and Fort Smith, Ark., not included.
[3] Fort Wayne, Ind., Sioux City, Iowa, and San Francisco, Calif., not included.
[4] Rochester, N. Y., Wichita, Kans., Memphis, Tenn., and Houston, Tex., not included.
[5] Montgomery, Ala., not included.
[6] Rochester, N. Y., not included.
[7] Fort Wayne, Ind., not included.
[8] Sioux City, Iowa, not included.
[9] Wichita, Kans., not included.
[10] Columbia, S. C., not included.
[11] Memphis, Tenn., not included.
[12] Fort Smith, Ark., not included.
[13] Houston, Tex., not included.
[14] San Francisco, Calif., not included.
[15] Fort Wayne, Ind., and San Francisco, Calif., not included.

FOREIGN AND INSULAR

CANADA

Quebec Province—Communicable diseases—Week ended August 9, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended August 9, 1930, as follows:

Disease	Cases	Disease	Cases
Chicken pox	5	Poliomyelitis	1
Diphtheria	19	Scarlet fever	36
Erysipelas	6	Tuberculosis (pulmonary)	43
Measles	7	Tuberculosis (other forms)	13
Mumps	3	Typhoid fever	21
Ophthalmia neonatorum	1	Whooping cough	51

Ontario Province—Communicable diseases (comparative)—Four weeks ended July 26, 1930.—The following table shows the number of cases of certain communicable diseases, with deaths therefrom, reported in the Province of Ontario, Canada, for the four weeks ended July 26, 1930, as compared with the corresponding period of 1929:

Disease	4 weeks, 1930		4 weeks, 1929	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	8	4	1	3
Chicken pox	556		547	
Conjunctivitis			5	
Diphtheria	165	6	184	11
Dysentery				1
German measles	47		7	
Goiter	4			
Gonorrhea	181		262	
Influenza	6	4	8	3
Lethargic encephalitis	2	2		
Measles	489		954	3
Mumps	40		137	
Paratyphoid fever	8	1		
Pneumonia		61		91
Poliomyelitis	12	4	1	
Puerperal septicemia	2			
Scarlet fever	272	3	164	
Septic sore throat			19	
Smallpox [1]	24		57	
Syphilis	198		208	
Tetanus	1	2		
Tuberculosis	132	37	116	35
Typhoid fever	37	1	23	2
Undulant fever	10			
Whooping cough	261	1	347	

[1] Cases of smallpox for this period were distributed as follows: Ottawa, 6; Gloucester, 4; Woolwich, 4; Kingston, 3; Holland, 2; 1 case in each of the following places, Niagara Township, Mount Forest, Toronto, Alexandria, and Nepean.

British Columbia—Psittacosis.—During the month of May, 1930, 7 cases of psittacosis were reported in the municipalities of Burnaby and New Westminster, near Vancouver, B. C. These cases were investigated and found to have had contact with sick parrakeets before the onset of the disease. The parrakeets were all purchased from a steamer which had brought them to Vancouver from the Orient.

CHINA

Meningitis.—During the two weeks ended August 2, 1930, 12 cases of meningitis, with 9 deaths, were reported in Canton, China.

GERMANY

Vital statistics—1929.—According to a recent report the births, deaths, and marriages in the German Reich (provisional figures) for 1929 as compared with 1928 were as follows:

	1929	1928
Births	1, 146, 706	1, 182, 815
Stillbirths	36, 189	37, 962
Deaths (excluding stillbirths)	805, 973	739, 520
Marriages	589, 451	587, 175

The reduced number of births, as compared with 1928, as well as the increased number of deaths during the first three months of 1929, were attributed to the severe influenza epidemic which prevailed at that time.

The following table, which shows the deaths from certain causes in German cities of over 15,000 population for the four quarters of the years 1928 and 1929, reflects the influence of the influenza epidemic in the high death rates reported for the first quarter of the year 1929.

Death rates per 10,000 in German cities of over 15,000 population

Cause of death	Quarters, 1928				Quarters, 1929			
	First	Second	Third	Fourth	First	Second	Third	Fourth
Accidents	3. 1	3. 4	3. 7	3. 3	3. 3	3. 6	3. 9	3. 2
Apoplexy	9. 0	8. 1	7. 0	8. 3	10. 4	8. 0	6. 7	8. 0
Cancer	12. 7	12. 8	12. 4	12. 8	13. 3	12. 8	12. 7	12. 9
Diphtheria	. 6	. 6	. 6	1. 0	. 9	. 7	. 7	1. 3
Heart diseases	15. 9	14. 4	11. 6	14. 1	20. 4	14. 1	11. 5	13. 4
Influenza	1. 3	1. 5	. 5	1. 2	15. 6	1. 2	. 4	. 8
Measles	. 4	. 3	. 2	. 2	. 4	. 4	. 4	. 4
Pneumonia	10. 6	8. 6	5. 0	7. 1	18. 9	8. 4	4. 9	6. 8
Other diseases of respiratory organs	4. 5	3. 4	2. 0	3. 2	7. 5	3. 4	1. 9	2. 9
Scarlet fever	. 3	. 3	. 2	. 2	. 3	. 2	. 2	. 2
Senility	8. 0	7. 2	5. 6	6. 8	12. 7	7. 1	5. 6	5. 9
Suicides	2. 6	2. 8	2. 6	2. 4	2. 5	2. 9	2. 9	2. 7
Tuberculosis	9. 9	9. 6	7. 9	7. 9	10. 4	9. 6	7. 6	7. 5
Whooping cough	. 4	. 3	. 3	. 3	. 7	. 3	. 2	. 4

MEXICO

Tampico—Communicable diseases—July, 1930.—During the month of July, 1930, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria		1	Smallpox	1	
Enteritis (various)		63	Tuberculosis	47	28
Influenza	3		Typhoid fever	4	4
Malaria	242	12	Whooping cough	5	
Measles		5			

TRINIDAD (BRITISH WEST INDIES)

Port of Spain—Vital statistics (comparative)—June, 1930.—The following statistics for the month of June for the years 1929 and 1930 are taken from a report issued by the Public Health Department of Port of Spain, Trinidad:

	June, 1929	June, 1930		June, 1929	June, 1930
Number of births	153	150	Deaths under 1 year	31	18
Birth rate per 1,000 population	28.0	27.1	Infant mortality rate per 1,000 births	202.6	120.0
Number of deaths	143	110			
Death rate per 1,000 population	26.2	19.9			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16
Afghanistan	C													P[1]					
China:																			
Canton	C					1	1	1		2				2	1				
Manchuria—Dairen	C	1																	
Swatow	C							3	4	3									
India	C	5,914	10,817	41,462	15,596	14,600	12,468	13,647	10,088	10,103	10,162								
	D	3,371	5,866	27,906	12,782	11,882	9,756	10,458	7,802	7,110	6,455								
Bassein	C			7	3	4													
	D			5	3	2													
Bombay	C		4															2	
Calcutta	C	269	354	647	194	175	142	98	78	73	94	77	81	53	49	37			
	D	153	220	414	125	107	83	57	44	36	36	63	54	28	23	23			
Negapatam	C									1									
	D									1									
Rangoon	C	3	2	1		5	2	2	1	1	2	2	1						
	D	1	2	1		1		2	1	1	1	1	1						
India (French):																			
Chandernagor	C	4	1	6	2	2	2				1	2							
	D	2	3	5	1	4	1				1	1							
Karikal	C	4	12	1								3							
	D	1	9	1								3							
Indo-China (see also table below):																			
Pnompenh	C	9		2	1				5	10	11	14	9	16	7		5		
	D	7	6			2	2	1	1	4	7	6	6	9	5	2	3		
Saigon and Cholon	C	5	14	76	59	40	48	13	17	19	7	5	7	1	1	1	2		
	D	4	6	55	43	27	24	7	11	10	2		3						

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930				June, 1930				July, 1930				August, 1930		
					10	17	24	31	7	14	21	28	5	12	19	26	2	9	16
Philippine Islands: [2]																			
Ports—																			
Cebu	C											1	20	13	13	9	5	4	
	D												9	7	12	8	4	1	
Iloilo	C													1	11	17	9	19	32
	D														9	13	10	18	19
Manila	C							1										1	
Provinces—																			
Antique	C																14	4	
	D																7	4	
Bohol	C																	45	67
	D																	26	37
Bulacan	C								1			2				3			
	D								1										
Capiz	C																3	1	
	D																2	1	
Cebu [3]	C							1	13	26	118	198	313	205	121	57	63	37	4
	D							1	11	23	50	86	131	78	61	35	37	27	3
Iloilo [3]	C										1	1	20	3	75	66	250	227	176
	D											1	10	3	54	49	146	164	119
La Union	C													1					
Leyte [3]	C										21	26	6						
	D										12	7	7						
Masbate [3]	C											10	14	25	8	20	37	27	
	D											3	2	15	2	4	18	11	
Misamis, Occidental [3]	C												1	2					
	D												1	2					
Negros, Occidental [3]	C						1	9	5	55	50	30	62	90	193	165	178	99	50
	D						1	6	2	27	36	23	42	48	134	104	118	72	34
Negros, Oriental	C															17	9	2	
	D														1	9	3	3	
Nueva Acija	C															1			
	D															1			
Pampanga	C										1	1	2						

Pangasinan	C												2		1				
	D												2						
Rizal	C									1									
	D									1									
Samar	C																	5	4
	D																	5	3
Surigao	C																	15	4
	D																	9	2
Tarlac	C																2		
Siam	C	7	1	29	12	4	13	4	8	10	6	3	8						
	D	4		13	10	2	7	2	3	9	4	3	4						
Bangkok	C	2	2	15			6	3	5	3	3	1		3	4	1	1		
	D		1	4			2	1		3		2		1	1	1	1		
Nagara Pathom	C	1		10															
	D	1		2															
Songkla	C													8		2			
	D													4		2			
On vessel:																			
S. S. at Suva, Fiji Islands	C	1																	
S. S. Sutley, at Batavia, from Calcutta	C	1																	
S. S. Sassari, at Massoua, from Jeddah	C							1											
	D							1											
On small boat at Port Cebu, from Bantayan Island	C								1										
	D								1										

Place		January, 1930	February, 1930	March, 1930			April, 1930			May, 1930			June, 1930	
				1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):														
Annam [1]	C	1	4		52				60		20	3	2	14
Cambodia [1]	C	147	90	49	32		18	6		5	31	52	56	88
Cochin-China [1]	C	177	65	5	22	55	43			188	224	259	147	126

[1] Reports incomplete.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Figures for cholera in the Philippine Islands up to July 5 have been corrected since the last issue from late reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930 10	May 17	May 24	May 31	June, 1930 7	June 14	June 21	June 28	July, 1930 5	July 12	July 19	July 26	August, 1930 2	August 9
Algeria:																		
Algiers	C													1	2			
Constantine	C								1				1					
Oran	C														2	1		
Argentina:																		
Andalgala.[1]																		
Villa Lia	D	2																
Azores: Ponta Delgada	C			8														
	D			5														
Belgian Congo	C												2				1	
	D												2					
British East Africa (see also table below):																		
Tanganyika	C	7		44														
	D			20														
Uganda	C	47	98	117	54	89		84	121	77	105	103						
	D	43	87	105	48	75		72	75	70	93	90						
Canary Islands: Las Palmas	D																	1
Ceylon:																		
Colombo	C	3	4	1	4	1		1	1				1	2				
	D	3	4	1	3	1		1	1				1	2				
Plague-infected rats		3	2	4					1									
Chile: Antofagasta	C	1	1	1														
	D		2	1														
Dutch East Indies:																		
Batavia and West Java	C	153	124	87	18	33	17	14	19	27	28	24	19					
	D	150	122	81	18	33	17	14	19	27	28	24	19					
Plague-infected rats		3	3	8			3	2	3	1								
Java and Madura	D	296	223	173	28	74	36	48	40									
Ecuador (see table below).																		
Egypt:																		
Alexandria	C	1	4	2	2	3	3	5	3	6	6	4	8	8	3	4	2	2
	D		1	2			1	2	2		2	5	2	3	2	3	2	1
Assiout	C			14	3	9	2	6	4	2	3		1	1				
	D			5		3	1	1		1		2	1	1				
Beheira	C		4															

Beni-Suef	C		4															
Dakahlieh	C	8	5	5	3	1	2	5	1									
	D		1			1	1											
Gharbieh	C			1													3	
	D			1													1	
Girga	C			1										1				
Minieh	C						6	1	1	1	4	4	2	1				
	D							1		1								
Port Said	C			1		1	1		1			1				1	1	
France: St. Ouen	C														1			
	D														1			
Greece (see also table below):																		
Patras	C		1								1				1			
Pyrgos	C		1															
Hawaii Territory, Hamaqua, Hawaii: Plague-infected rats											1							
India	C	5,639	4,087	2,215	281	188	117	62	55	59	62							
	D	3,940	3,344	1,960	271	205	103	56	42	52	43							
Bassein	C		3															
	D		1															
Bombay	C	1	7	4	4	1		1	1		2					1		
	D	1	5	8	1	4					1	1				1		
Plague-infected rats		31	86	108	23	39		19	6	7	8	5	13	14	10	15	10	
Madras Presidency	C	230	157	44	2		6	30	26	10	3			1	10			
	D	140	87	19		1	4	6	15	2	5			1	9			
Rangoon	C	7	3	5		1	3					1				2	2	
	D	6	3	4	1	1	1					1				2	1	
Plague-infected rats		7	3	4	1	3	1				1		2	2		2	4	
India (Portuguese)	D				7													
Indo-China (see also table below):																		
Pnompenh	C			3	1			2	6					1	1			
	D	13	13	4			1		5	1		1		1	1			
Saigon and Cholon	C		1		1				1		1							
	D		1								1							
Iraq: Baghdad	C	6	7	6	7	11	7	12	12	4	8	4	10	4	2	2	4	3
	D	1	4	2	3	5	4	6	7	3	5		5		1	1		2
Japan: Osaka (vicinity of)—Plague-infected rats		6	4	3														
Kwang-Chow-Wan	C	25	7	37		20		14	23		8							
Madagascar (see also table below): Tamatave	C			1					1									
Morocco	C	48	55	121	19	22	18	12	2		1							
	D	13	18	45	11	14	6	3	4									
Nigeria: Lagos	C	7	13		1	1			1		3	1	1					
	D	7	5		1	1			1		3	1	1					
Plague-infected rats		42	25	7	2	6	5	4	1	4	1	5						
Senegal (see table below).																		
Siam	C	17	16	5		1	1	3										
	D	13	15	6		1		3										
Bangkok	C	1	5			1	1	3									1	
	D	1	4			1		3										
Nagara Pathom	C	5	1	10														
	D	6	1	9														

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9
Siam—Continued.																		
Nagara Rajsima	C	2	1	1													1	
	D		1	1														
Syria: Beirut	C									2	5	5		2	4	3		1
Tunisia:																		
Sfax district	C	22		1	17			4	6		3					6		
Tunis	C	5	1	4				1		1				1	4			
	D								1					1				
Union of Socialist Soviet Republics:																		
Salsk Region	C								1			1						
	D								1									
Stavropol Region	C								1									
	D								1									
Union of South Africa:																		
Cape Province	C	2	1		P				1									
	D	1	1															
Orange Free State	C	11	5	1														
	D	3	3															
Transvaal	C	2	1															
	D		1															

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
British East Africa (see also table above):							
Kenya	C	69	85	16	171	107	
Uganda	C	109					
	D	90					
Ecuador: Guayaquil	C	2	2	0			
	D	2		0			
Plague-infected rats		2	2	0			
Greece (see also table above)	C			1		1	
Indo-China (see also table above)	C	30	27	4		11	
Madagascar (see also table above):							
Ambositra Province	C	49	25	14	1		
	D	41	20	12	1		
Antisirabe Province	C	22	38	46	19		
	D	22	36	45	19		
Itasy Province	C		4				
	D		4				
Miarinarivo Province	C	25	14	1	5		
	D	25	14	1	5		
Madagascar (see also table above)—Continued.							
Moramanga Province	C	7	5	3	1		
	D	4	5	3			
Tananarive Province	C	110	52	39	15		
	D	107	52	38	14		
Senegal:							
Baol [1]	C		18	24	13	2	21
	D		8	12	11	2	11
Dakar [1]	C			2	52	53	90
	D			2	42	117	77
Louga [1]	C	2		33	54	60	88
	D			10	27	21	58
Thies [1]	C		3	12	21	52	24
	D		2	9	8	35	16
Tivaouane [1]	C		11	71	135	43	91
	D		8	38	69	28	49

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930				June, 1930				July, 1930				August, 1930	
					10	17	24	31	7	14	21	28	5	12	19	26	2	9
Algeria:																		
Algiers	C	1	5	1		1		2										
Constantine	C										1				1			
Oran	C		1															
Arabia: Aden	C	2	3	1									1					
Bolivia: La Paz.[1]																		
British Borneo: Sarawak	C	19																
British East Africa (see also table below):																		
Tanganyika	C	49	103	57	33	45	55	276	385	755	196	274	64					
	D	8	7	14	3	5	8	54	154	90	31	26	13					
British South Africa:																		
Northern Rhodesia	C		9	1			57	2										
	D			2			9											
Southern Rhodesia	C	6		66	53		42	60	75	1	3							
	D			1	4		8	1										
Canada:																		
Alberta	C	4	10	4										2	1	2	1	
Edmonton	C	1	4	3														
British Columbia—Vancouver	C	16	20	17			2	2	1	1			2	2	1	1	1	
Manitoba	C	2	4	4			7	3			4							
Ontario	C	86	100	77	14	24	24	20	14	10	13	10	3	5	6	10	8	
North Bay	C	1			1													
Ottawa	C	11	19	21	3	10	7	5	6		8	1	1	1	4	7	5	1
Toronto	C						3	1	2	1	1			1				
Quebec	C											4	3					
Montreal	C																7	
Saskatchewan	C	76	47	41	20	6	10	3		12	10			2		3		
Regina	C				1		3											
Ceylon:																		
Angoda, Western Province	C	10		6														
	D	1		2														
Colombo	C	3																
	D	2																
China:																		
Canton	C	11	6	3					1									
	D	3	2	3														

Chungking	C	P		P	P		P	P	P			P	P					
Foochow	C	P		P		P		P		P		P						
Hong Kong	C	62	38	18	5	5	2		2	1	1			2				
	D	51	25	23	4	2	3		1		1	1		1				
Manchuria—																		
Harbin	C			1		10	10											
Kwantung—Dairen	C	5		2	1		7			11	5		8					
	D						4				1							
Nanking	C	P	P	P	P			P	P	P				P	P			
Shanghai—																		
Foreigners only	C	2	2	3		1	1		1	1	1	2	1	1	1	1	3	
Including natives	D	7	10	10		1	2	2	1		1	1						
Swatow	D	6	6	3	1		1	4	1		1	2	1					
Tientsin	C	1	2	2	1													
Chosen (see table below).																		
Colombia:																		
Barranquilla	C	102	2	1														
Buenaventura	C	1		15	2		1	1	1	1		4	4	3	2	1		
Costa Rica:																		
Port Limon	C			6				2	2									
San Jose [2]	C		10	7														
Curacao (alastrim)	C		14	2	2					1			2					
Dahomey (see table below).																		
Dutch East Indies:																		
Borneo	C		185	90		10	4	2	2	10				2				
	D		12	31	1					1								
Java—																		
Batavia and West Java	C	14	78	64	1	1	5	5	1	4	6	2	3	1	3	1	1	
	D	7	6	11	1	1	3	2		1	2		2	1	1	1	1	
East Java and Madura	C			4											1			
Sanggi Islands	C	12	5	160	14	12												
	D		1	24	1	4												
Sumatra	C		48															
	D		5															
Egypt: Port Said	C			1		1								2		1		
Great Britain:																		
England and Wales	C	1,530	1,700	1,427	462	324	304	327	237	266	241	182	156	138	126	109	70	
Ashton under Lyne	C	29	15	18	6	3	4	4			3	4		4	2	2		
Bradford	C	2		3		1		1					1					
Cardiff	C		2	3									2					
Leeds	C	11	16	2									1					
London	C	699	710	602	222	138	148	129	130	136	125	107	84	52	62	48	36	
London and Great Towns	C	1,156	1,239	1,066	339	250	235	254	197	208	190	158	127	96	102	83	61	
	D	5	3	3														
Sheffield	C		8	2														
Stoke-on-Trent	C	41	122	85	19	9	13	21	3	10	15	4	3	2	1	3	1	
Scotland	C								1		3			1				
	D													1				

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930 10	May 17	May 24	May 31	June, 1930 7	June 14	June 21	June 28	July, 1930 5	July 12	July 19	July 26	August, 1930 2	Aug. 9
India	C	36,036	39,329	34,843	6,533	6,549	5,416	4,337	3,686	3,559	3,174							
	D	7,710	9,109	6,983	1,449	1,814	1,196	993	1,065	913	905							
Bombay	C	638	718	430	52	68	58	40	36	35	23	19	17	15	11	7	6	
	D	314	431	270	33	49	44	35	27	23	19	10	13	9	9	2	5	
Calcutta	C	399	361	495	109	70	52	71	46	45	45	25	27	19	13	14		
	D	287	305	403	94	72	40	52	50	37	29	30	17	17	12	10		
Cochin	C	184	291	183	13	8	7	9	4	1	10	1			4	2	2	
	D	29	35	13	5	1	2		2	1	1							
Karachi	C	38	33	30		6	7	1	5		1	1				1	2	
	D	16	47	17	2		1	1	2		1						2	
Madras	C	159	173	133	24	13	15	20	9	10	8	8	6	10	17	16	19	
	D	29	36	27	4	5	6		6	3	1		4	1	3	4	3	
Moulmein	C	143	146	43	27	29	20	13		9	6	6	4	10	3	1		
	D	40	41	7	4	6	5	6		3	3	1	3	4	1	2		
Negapatam	C	1					1			1		1			1		2	
Rangoon	C	7	10	4	2		3	1	1	5	1	2	2	1	1			
	D	2	5		1						1	1						
Tuticorin	C						5				1							
Vizagapatam	C	9	69	6	3	1	1			1								
	D	1	18	2		3												
India (French):																		
Chandernagor	C	11	6	10	6	2	8	8	4	8	5	2	3	1	4			
	D	5	2	2	2	4	1				2	1	1	1	1			
Karikal	C	12	24	19	6	5	1		4	3	1	3	1		1			
	D	8	7	8	2	1			2	2	1	3	1		1			
Pondicherry Province	C	52	21	24	9	13	10	8	4	4	9	6	4	9	8	5		
	D	40	13	20	7	12	10	7	4	4	9	6	3	9	8	5		
India (Portuguese)	C	50	38	44	2	27	5	13		3	18	7	1					
	D	5	2	8		3	1	4		2	2	6						
Indo-China (see also table below):																		
Pnompenh	C				1		1	1							1			
	D			2					1						1			
Saigon and Cholon	C	4	3	5	1	1		1	1									
	D	2	1	5		1		1										1
Iraq:																		
Baghdad	C	3		8	1				1				1					
	D	1		1	1													
Basra	C	1		1														

Mossoul Liwa	C	12		22	13		8			1		3	47	20				
	D	2		3	2		1			1			19	1				
Ivory Coast (see table below).																		
Jamaica (alastrim)	C							2										
Japan: Tokyo	C			1														
	D			1														
Macao	D	2	3	2	1													
Mexico (see also table below):																		
Jalisco (State) Guadalajara	D	14	22	20			6	1	4		5	6	3	1				1
Juarez	C	3	2								6							
	D	1									1							
Mexico City and surrounding territory	C	38	106	99	30	15	17	18	17	23	20	17	10	12	4			
	D	21	31	47	6	12	8	6	5	4	3	5	2	3	1			
Progreso	C						1											
	D						1				1							
San Luis Potosi	C	1																
	D	1																
Morocco (see table below).																		
Nigeria: Lagos	C	2	1	1								1						
Philippine Islands: Sarangani and Balut Islands	D	3																
Poland	C	2		7		1		2										
Portugal: Lisbon	C	7	7	8	6		2		1		2	7		7				
Rumania	C	1	2															
Siam	C	2		8	2								2					
	D			4														
Somaliland, British: Boales	C	19	2															
	D	2	6															
Spain	C									4		8		1	1	3		
Straits Settlements	C		5	5	1	3	2	5	5		1	3	1	2	7	1	1	1
	D		1	2		1	1	1	1		1		1	1	1			
Sudan (Anglo-Egyptian)	C	79	60	42		5	13	1	4	8	1	54	8	1		3		
	D	6	5	4			1	1				3		1				
Sudan (French) (see table below).																		
Switzerland: Berne Canton	C															1		
Syria (see table below).																		
Taiwan: Taihoku (see table below).																		
Tunisia: Tunis	C	3	3	4		1		1			2					1		
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P										
Orange Free State	C	P	P															
Transvaal	C	P	P															
Upper Volta	C	26	2	3				1			8	5						
Zanzibar	C		13															
On vessel:																		
S. S. Tairoa, at Liverpool, from London	C	1																
S. S. Karagola, at Lourenco Marques, from India	C	1																
S. S. Elysia, at Port Sudan, from Bombay	C			1														
S. S. Naldera, at Port Said	C				1													
S. S. Manoa, from Honolulu to San Francisco	C											1						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		January, 1930	February, 1930	March, 1930			April, 1930			May, 1930			June, 1930			July, 1930	
				1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20
Indo-China (see also table above)	C	460	434			26	261				173	132	80	133			
Ivory Coast	C				7												
Sudan (French)	C	229	213		200	409	371		150	40	56	178	76				34
	D	25	11		18	31	30		6	7	7	18	18				
Syria: Beirut	C	70	18	4	8	5	10	2	7			7	6	1			
Taiwan: Taihoku	C		43	31	12	15	10	2									

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
British East Africa (see also table above):							
Kenya	C	12	12	175	174		
Uganda	C	184	109			78	
	D	155	99			69	
Chosen	C	1	4		5		
	D		1		1		
France	C	9	23	8		3	
Mexico: Durango (see also table above)	D	12	6	5	4	4	3
Morocco	C	29	74		10	18	5
Turkey	C	215	114		3	16	
	D	66	42				

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930				June, 1930				July, 1930				August 2, 1930
						10	17	24	31	7	14	21	28	5	12	19	26	
Algeria:																		
Algiers	C	3	4	6	8	1	2	4	8	2		1			1	2	3	
Constantine Department	C	4	5	11	15		4		2	11		1			1	1		
Oran	C	2							3				4		2	1		
Arabia: Aden	C			1														
	D			1														
Bolivia: La Paz.[1]																		
Brazil: Porto Alegre	C		2			1												
Bulgaria	C		13	9	15	1		5		1		9	6		4	5	1	
	D		1		1	1		1		1						1		
Sofia	C	1																
Chile:																		
Talcahuano	D	1																
Valparaiso	C	1																
China:																		
Manchuria—Harbin	C		1	4	52													
Shanghai	C			1														
Tientsin	C	1																
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C				1							1	1	1				
Beheira Province	C	14	18	2	2	9	21	9	10	17	16	7	5		5	1	9	
	D		5			4	4	4	1	1	1		2		1		1	
Cairo	C		1															
Port Said	C	2	1															
Suez	C	1																
Great Britain: Scotland—																		
Dunfermline	C														1			
Glasgow	C						1											
	D						1											
Greece (see table below).																		

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 12–Feb. 8, 1930	Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930				June, 1930				July, 1930				August
						10	17	24	31	7	14	21	28	5	12	19	26	2
Iraq: Baghdad Liwa	C			2														
Ireland:																		
Irish Free State—																		
Galway County—Oughterard	C																2	
Kerry County—Dingle	C				5													
Leitrim County—Mohill	C												9				1	
Mayo County—																		
Ballina	C								2		1				1			
Swinford	C						7	7										
Westport	C															2		1
Roscommon County—																		
Roscommon	C															1		
Strokestown	C															1		
Wicklow County—Shillelagh	C										1		3	1		1		
Northern Ireland—Cookstown	C		3															
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico: Mexico City, including municipalities in Federal District	C	12	9	4	4		2		4	2	3	1	3	2		2		
	D	4		1	4				3		1							
Morocco	C	23	21	38	15	3	6	1	1	1		6	8		4	3	4	
	D			7	3													
Palestine	C		1	6	1		2			2				3	1	1	1	
Poland	C	296	183	228	243	64	45	34	28	39	15	26	37		24		12	10
	D	21	8	13	15	2	2		1	3	3	2	3		4			1
Portugal:																		
Lisbon	C				4													
Oporto	C		1	2	1													
Rumania	C	241	293	185	186	60	58	61	48		32							
	D	25	23	12	11	10	11	6	8		3							
Spain: Valencia	C										2		1		3			
	D														1			
Tunisia	C		3			2	2	1	1			2	16			14	10	2
Turkey (see table below).																		

Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P			P	P	P	P			
Natal	C	1	3	P	P	P	P		P			P		P	P			
Orange Free State	C	P	P	P		P	P	P	P			P	P	P	P			
Transvaal	C				P•													
Yugoslavia (see table below).																		

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
Chosen: Seoul	C		17		3		
Czechoslovakia	C	10	2	42	29	12	
Greece: Athens	C	12	6	3	1	3	
Latvia	C	18				3	3
Lithuania	C	2	70	62	73	27	16
	D		5	4	4		
Turkey	C	2	3	1	3	16	2
Yugoslavia	C	26	33	46	22	16	6
	D	3	5	2	4	1	

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

×

UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

BY THE UNITED STATES PUBLIC HEALTH SERVICE

VOLUME 45 :: :: NUMBER 36

SEPTEMBER 5 - - 1930

SPECIAL ARTICLES

Chief Etiological Factors of Plague in Ecuador

Establishments Licensed for Biological Products

UNITED STATES
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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

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CHIEF ETIOLOGICAL FACTORS OF PLAGUE IN ECUADOR AND THE ANTIPLAGUE CAMPAIGN

By C. R. Eskey, *Surgeon, United States Public Health Service*

I. CHIEF ETIOLOGICAL FACTORS

THE INTRODUCTION OF PLAGUE

The first country on the west coast of South America to be invaded by plague was Peru. It is stated that the disease was introduced into Peru through the agency of a vessel from India with a cargo of jute bags in 1903. There is little doubt that plague was carried from Peru to Guayaquil, Ecuador, but the particular vessel that brought the disease is unknown.

The first evidence of plague in Guayaquil was a very fatal epizootic among the rats which occurred early in February, 1908. Surg. B. J. Lloyd, of the Public Health Service, who was stationed in Guayaquil at that time, diagnosed the infection among the rats as plague and predicted that human cases would soon appear. This prediction proved to be correct, as 63 cases followed in the same month and 225 in March, the greatest number ever reported in Guayaquil in one month.

CHARACTER OF THE EPIDEMICS IN GUAYAQUIL

During the 22 years from 1908 to 1930 there were 7,616 cases of plague officially reported in Guayaquil, distributed as follows: In the first five years 3,183 cases, or 42 per cent; in the second five years 2,695 cases, or 35 per cent; in the third 5-year period 909 cases, or 12 per cent; and in the last seven years 829 cases, or 11 per cent. These figures show that during the first 10 years there was a slow decline in the number of cases and then an abrupt fall followed by another sluggish decline. Table 1[1] shows that in the past 12 years the number of cases reported annually has varied little, with the exception of 1921, which was the last year, with over 200 cases reported, and the years 1919, 1922, and 1928, when less than 100 cases occurred.

[1] The tables will be published in the following issue of Public Health Reports.

It should be noted that when the number of cases reported in a year is less than 100, the disease shows a marked increase in the following year and a still greater rise in the second year succeeding the light year, a condition indicating that the disease should reach a greater height in 1930 than it did in 1929. A casual study of Table 1 might give the impression that plague would voluntarily disappear from Guayaquil; but a closer analysis indicates that the disease has probably reached its lowest level, and active outside measures will be necessary to cause it to become extinct.

SEASONAL PERIODICITY

With the exception of the epidemic in 1909 there has been a marked seasonal variation in the number of cases of plague reported. In Table 1 it can be seen that the disease is at its lowest level from May to October, while June and July are months of unusually low incidence. Since 1918 there have been years with three to four consecutive months without any cases being reported. In most years the number of cases began to increase in September. Prior to 1916 the yearly epidemic reached its highest point in October, November, and December, or the last months of the dry season; but since that date the greatest number of cases has been reported in January, February, and March, the first three months of the rainy season. In 1916 the disease was more prevalent than in any other year except the second year, 1909. Since the shift to January and February as the peak months, the number of cases occurring in these months has, on an average, been less than it was in the same months before the shift. It therefore appears that there has been a very marked decrease in the number of cases occurring at the end of the dry season and a slight decrease in the cases at the beginning of the wet or rainy season.

EXPLANATION OF THE CHANGES IN EXTENT AND CHARACTER OF EPIDEMICS

The decreased yearly incidence of human plague in Guayaquil, especially as noted in the past 12 years, is probably due to the effect produced upon the rat population by their continuous exposure to the disease. The climatic conditions are practically the same from year to year, and it is not believed that there has been any marked variation in the *X. cheopis* index for the same seasons of the different years since the onset of plague in 1908. Although some measures have been taken to lessen rat harborage in buildings, and rats have been trapped continuously, the degree of rat infestation was probably as great in the last 12 years as it was during the first years of

the epidemics. In fact, the great mortality from plague among the rats during the first epidemic years, as evidenced by finding enormous numbers of dead rats, must have caused a greater reduction in the rat population than measures instituted to control the disease. The results of trapping since 1925 and the reports of householders both point to an excessive rat infestation during the past few years when human plague has been lowest. It therefore appears that the decrease in the human plague epidemics of recent years has been due to a reduction in rodent plague because of a gradually increasing immunity of rats to plague infection.

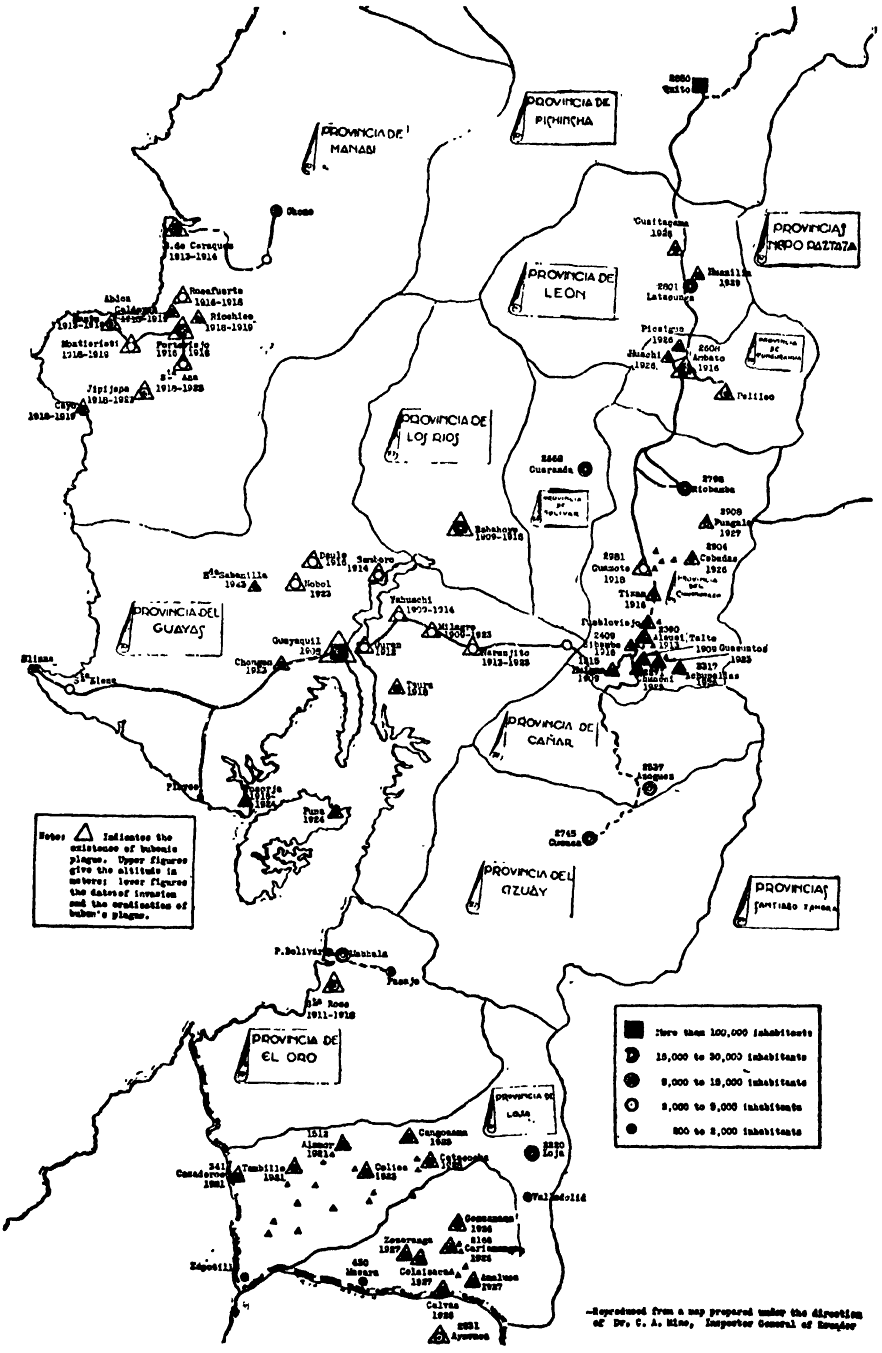
The shifting of the season of the greatest number of human cases from the last months of the dry season to January, February, and March of the rainy season, as occurred following the year 1916, does not offer an easy explanation. Later in this report will be found evidence indicating that rats harboring outside of buildings in Guayaquil are probably less exposed to plague infection than those living within doors, because the former have a very low *X. cheopis* index. On this basis we may assume that the rats harboring within buildings have developed a greater immunity to plague because of a closer association with the disease, and that each year the infection spreads slowly among the nonimmune indoor rats, particularly the younger rats born each year, until the onset of the rains. The flooded condition of Guayaquil, due to the heavy rainfall, forces large numbers of the outside rats to seek shelter within buildings; and with the advent of these less immune animals, rodent plague increases markedly with a consequent rise in the number of human cases during January, February, and March.

SPREAD OF PLAGUE TO OTHER TOWNS AND VILLAGES

From Guayaquil bubonic plague has spread to a great many inland towns located on the Quayaquil & Quito Railroad, and from them to near-by villages and haciendas. It has also invaded several river towns and minor seaports connected with Guayaquil by vessels.

Table 2 gives a schematic outline of the relationship of plague epidemics in Guayaquil to its appearance in other lowland river towns and to its invasion from these places into the mountain towns and Indian villages or caserios and haciendas. The towns are placed in the order of their distance from Guayaquil. The terminus of the railroad is not in Guayaquil proper, but in the village of Duran, across the Guayas River; the two places, however, are in constant communication by ferries. If the different epidemics of the inland towns are due to the disease in Guayaquil, one would expect to find cases at Duran in the same or preceding years. This has been the case in nearly every instance, although

in 1909, 1916, and 1923 apparently no cases were reported in Duran, and other inland towns were invaded. When plague has been



Map of Ecuador showing plague-infected localities with dates of invasion and eradication.

most prevalent in Guayaquil, as in 1909, 1913, and 1916, the disease has also invaded the inland towns, showing a rather definite relationship.

Milagro is an important link between the lowlands and the mountain districts, because practically all rice and sugar are shipped from this place to the interior. Table 2 shows that plague was present in Milagro every year, except 1919, that it occurred to any extent in the mountain districts.

Plague outside of Guayaquil has always been more or less sporadic in character, and it will be observed in Table 2 that the disease is seldom present more than one year and then disappears for varying periods of time from all the inland towns. Duran is the only exception to this rule.

Plague has appeared at irregular intervals at the river towns of Posera, Nobol, Daule, and Colines, and at the small seaports of Manta, B. d. Caraquez, Puna, and Cayo. There is constant communication by means of many small vessels between these places and Guayaquil. Daule was the first river town infected. Plague was reported here during the severe epidemic of 1916. Manta and the neighboring seaport of B. d. Caraquez were infected in 1913, and Cayo in 1918. From Manta the disease spread to six small neighboring villages. It was reported at intervals in the seaports and near-by villages from 1913 to 1923, when it disappeared and to date has not returned.

Plague invaded the mountain Province of Loja, in southern Ecuador, during 1921 and has been reported at 11 small villages and 21 haciendas in this region since then. As it is very difficult to reach this part of Ecuador from the north, the disease probably spread from Sullana and Paita, Peru, to the Loja district, so that it is in no way related to the plague-infected northern and central parts of Ecuador with which this report is concerned.

TYPES OF PLAGUE FOUND IN ECUADOR

Pneumonic plague is said to have been observed in Ecuador, but is very rare; although the wiping out of two Indian villages in the mountains suggests that this form might have been responsible. Septicemic plague in its usual character is not common, as indicated by the low mortality rate. Bubonic plague is the most common form of the disease, as in most other countries; but it is stated by those treating most of the cases that axillary buboes are very frequent, especially in the mountain districts. Lack of data prevents giving exact statistics of the different types of plague.

There are two forms of plague frequently encountered in Ecuador which are not common in other parts of the world. These two types have been designated locally as "angina pestosa," or a tonsillar form, and "viruela pestosa," or a vesicular form resembling chicken pox and smallpox in some of its manifestations. These forms of plague are more frequent in the mountain regions than in the lowland districts.

It is desired to emphasize the fact that both occur to some extent in Guayaquil. The frequency of angina and viruela pestosa in the higher altitudes is well illustrated in a small family epidemic which occurred at Riobamba in November, 1929. Among 11 cases of plague in a family group, there were 3 cases of the vesicular type and 2 of the tonsillar type—nearly half of the cases being atypical plague. As Doctor Martinez, in charge of the plague hospital at Guayaquil, is preparing a report on these two forms of plague, only a short account will be given here.

Angina pestosa occurs as a violent form of tonsillitis and pharyngitis, with secondary invasion of the cervical glands. This form of plague is the result of a mouth infection due to the habit of the Indians of killing vermin with their teeth. The exact mortality of angina pestosa is not known but it is greater than the ordinary bubonic form although not necessarily fatal, as only one of the two cases in the outbreak at Riobamba died.

Viruela pestosa begins as the ordinary bubonic disease, but the skin eruption that follows is likely to obscure the buboes. Vesicles develop which pass through stages very similar to those of varicella. The vesicles may be few in number or present to the extent that they are found in a severe case of chicken pox. The vesicles are evidently the result of a septicemia from the primary buboes. The mortality of viruela pestosa is relatively high. Doctor Martinez states that when the vesicles exceed 50 the result is nearly always fatal. Only one of the three cases at Riobamba in November died.

Proof that the vesicles of viruela pestosa are due to bacillus pestis was clearly established in November, 1929, at the laboratory in Guayaquil. A small amount of serum was taken from a vesicle of a patient in the plague hospital and inoculated through the skin of a guinea pig. The guinea pig died in three days. At autopsy there were definite macroscopical plague lesions and smears from the spleen, liver, and heart blood were teeming with the coccobacillus.

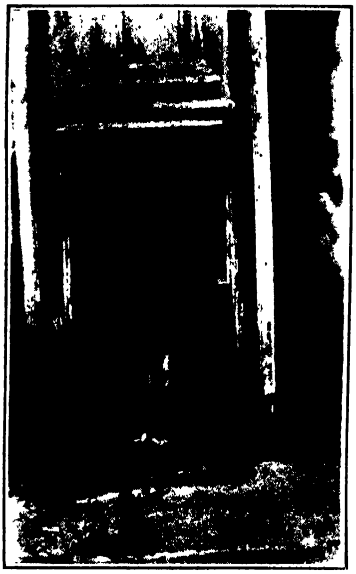
PLAGUE MORTALITY IN ECUADOR

The mortality rate of plague in Guayaquil in recent years has been unusually low. During the past five years only 36.8 per cent of the cases have died. It is probable that this figure is higher than it should be because unreported cases that have recovered can not be included, while most of the fatal cases have been discovered after death. Table 3 gives the percentage of deaths during the 5-year period ended December, 1929. In this table it will be noted that during the months of greatest incidence, October to March, inclusive, the death rate has been higher than during the other months when there was a tendency for the disease to disappear. The greatest mortality rate occurs in the months of December and January.

HUT AT NISAC IN WHICH A CASE OF PLAGUE WAS FOUND DECEMBER 15, 1929

TYPICAL INDIAN HUT AND YARD AT NISAC

TYPICAL INDIANS AT NISAC



FALSE COLUMN—TIN-INCASED POSTS COMMON IN FRONT OF BUILDINGS IN GUAYAQUIL

STREET IN GUAYAQUIL SHOWING FALSE COLUMNS WHICH PROVIDE RAT HARBORAGE

PRIMITIVE WATER SYSTEM OF HUIGRA

VILLAGE HOUSES ABOUT 15 MILES FROM GUAYAQUIL

The yearly death rates have varied from 29 to 45.2 per cent. All cases of plague are given curative serum from the Pasteur Institute at the plague hospital in Guayaquil.

There is no means of determining the actual death rate among the cases in the mountain districts, but persons in charge of this area state that in recent years the mortality has been very low, especially among those with the bubonic type. Of the six bubonic cases at Riobamba in November, 1929, only one, an old woman, died.

LIVING CONDITIONS

As in other countries, plague is most prevalent among people living under poor hygienic conditions and in the crowded tenement areas. There has been no case of plague reported in the last five years among the people living on the two streets, Nueve de Octubre and Malecen Streets, Guayaquil, upon which are located the best type of buildings and where the wealthier people live.

In the mountain districts the Indians live in houses which have one room as the living quarters and often a second room in which they store their grain. Besides the family in the one living room, there are a varying number of unrestrained guinea pigs, often 20 or more. There is a law prohibiting the raising of guinea pigs in houses, but is it not observed or enforced. In certain districts in the mountains there is a frequent history of all the guinea pigs in a house dying either before or after the occurrence of human plague in the same house. There is little doubt that the close association between families and guinea pigs causes many cases of plague. The Indians will not give up their guinea pigs because the meat of this animal is greatly relished and is the chief food at their fiestas.

INDIAN DEATH CEREMONIES

The Indians of the Sierras have a custom which is undoubtedly responsible for causing many cases of plague among them and prevents the disease from dying out in this region as quickly as it does in the towns of the mountains. This is the "velorio," or death wake, held in the house of the deceased. The relatives and friends come from long distances to attend the death ceremony, which lasts from two to five days. They feast and drink, and lie about in the room of the deceased in a drunken stupor most of the time. They handle the body and clothing of the dead person, and later take it to the nearest town for burial. Many cases of plague have been traced to these velorios; in one instance seven of the participants developed the disease. When the Indians return to their homes they may carry not only the disease but infected fleas as well. There is a movement under way to induce the Indians to hold their death ceremonies in a

special building for this purpose, and if this plan should be adopted it would tend to reduce other contagious diseases as well as plague.

CLIMATIC CONDITIONS

Official weather reports could be secured for only two cities in Ecuador, Quito, and Ambata, with which this report deals. Guayaquil has no weather bureau, but satisfactory temperature records for the past four years were obtained through the courtesy of Mr. Harold Clum, American consul, who has kept a record of the maximum and minimum daily temperatures during this time.

The tropical climate of Guayaquil is considerably moderated by the cold Humboldt current of the South Pacific. Table 4 gives the average mean temperatures for the past four years. There is little variation in the temperatures of the different months, as the mean high temperatures vary only from 79.9° to 85.1° F., and the mean low temperatures from 70.9° to 75.6 F°. The average mean temperatures ranged only from 75.4° to 80.1° F. The difference in the different mean temperatures for the same months in the four years was less than 1°. The hottest months are January, February, March, and April. These are the months of the rainy season, and consequently the humidity is also very high during this time. In fact, molds grow upon leather goods and other articles in houses of the best type of construction because of the excessive dampness of the rainy season.

The dry season begins in May each year and lasts until the last week in December or the first of January, as a general rule. The humidity of the dry season is moderate, as the sky is overcast with clouds nearly all the time. The onset of the rainy season varies somewhat in the different years as does also the amount of rainfall. No official figures were obtainable regarding the amount of rainfall in Guayaquil, but the average is probably between 40 and 50 inches. The whole city is flooded with water nearly the entire four months of the rainy season of most years.

The rainfall of the rainy season of 1930 was exceptionally low and is believed to have prevented the typical findings of an average year. It is also believed that from the beginning of the rainy season, January 21, to the end of March, 1930, there was less than one-fourth of the usual rainfall. Furthermore, the mean temperature of the first half of January, 1930, was higher than usual by nearly 2½°.

The climate of the other lowland towns of Ecuador is very similar to that of Guayaquil, although as one proceeds along the Guayaquil & Quito Railroad toward the mountains there is an increase in both the amount of rainfall and the temperature. Duran has exactly the same climate as Guayaquil. At Yaguachi there is sufficient moisture to permit the successful raising of sugarcane. From Milagro to

the high mountains the rainfall is much greater than at Guayaquil; in fact, at the towns of Barraganetal and Bucay there are rains throughout the year, with a high humidity and temperature. It is desired to emphasize the point here that neither of these two towns has been invaded by plague and that only one case of plague has been reported at the village of Naranjito, which is on the mountain side of Milagro.

Huigra is the first mountain village of any size. The climate is drier here than at Guayaquil. It has fairly warm days and cool nights.

In Table 5 are given the only reliable data that could be obtained of the climatic conditions in the mountain districts. However, it so happens that in the two places of Ambato and Quito we have in the case of the former a town that has been invaded by plague several times, while Quito, with an altitude about 1,000 feet higher than Ambato, has never had a case of plague. Therefore, the extreme limit at which plague is likely to occur in Ecuador is within the narrow zone of the difference between the climatic conditions of these two places. The topographic location of these two cities, Ambato in a narrow deep valley and Quito in a shallower wider valley, as well as the difference in altitude, is a climatic factor. They are only 91 miles apart, but Ambato has an average mean yearly temperature of about 57.5° F., while that of Quito is about 55.3° F. Both cities have considerable variation between their daily high and low temperatures, which is never less than 20° and in most months about 25° or more. During the month of November the daily variation of Ambato is often 35°, from freezing to over 70°. The most important difference in the temperatures of these two places as regards effect on plague is believed to be the mean high temperature. In the case of Ambato the mean high temperature is over 70° F. from October to June. When Ambato is invaded by plague the disease begins in February or March and dies out in June. Quito has only two months with a mean high temperature of 70° F. or higher.

The rainfall of Quito is considerably greater than that of Ambato; but if the relative humidities of the months of July, August, and September are indicative of those of the other months, Quito has a lower humidity than Ambato.

Altitude and temperature are not necessarily rigorously related, for both Riobamba and Latacunga are lower than Quito, yet they have colder climates. Riobamba is situated on the top of the plateau region and not in a valley. The rainfall of Riobamba is less than that of either Quito or Ambato. Guamote and Riobamba have very similar climates, although Guamote is about 1,000 feet higher than Riobamba.

ALTITUDE [2] AND PLAGUE

Guayaquil and the other coast towns are practically at sea level. Bucay, at which plague has never occurred, is in the foothills, with an elevation of 975 feet above sea level.

Huigra is the first mountain town that has been infected with plague. It has an altitude of 4,000 feet. Plague appeared in Huigra in 1909 and has occurred there several times since.

After leaving Huigra, the elevation mounts rapidly. The following is a list of the mountain communities with their elevations and notations regarding the presence of plague at each place:

Sibambe has an elevation of 5,825 feet. Plague first occurred here in 1916. There have been cases at different intervals since that time.

Alausi is 8,550 feet above sea level. Plague was first reported here in 1913 and has invaded the town in four different years since 1913. Plague has also appeared in a number of isolated Indian villages and haciendas near Alausi.

Tixan has an elevation of 9,230 feet. Plague was present here in 1916. This is a very small village.

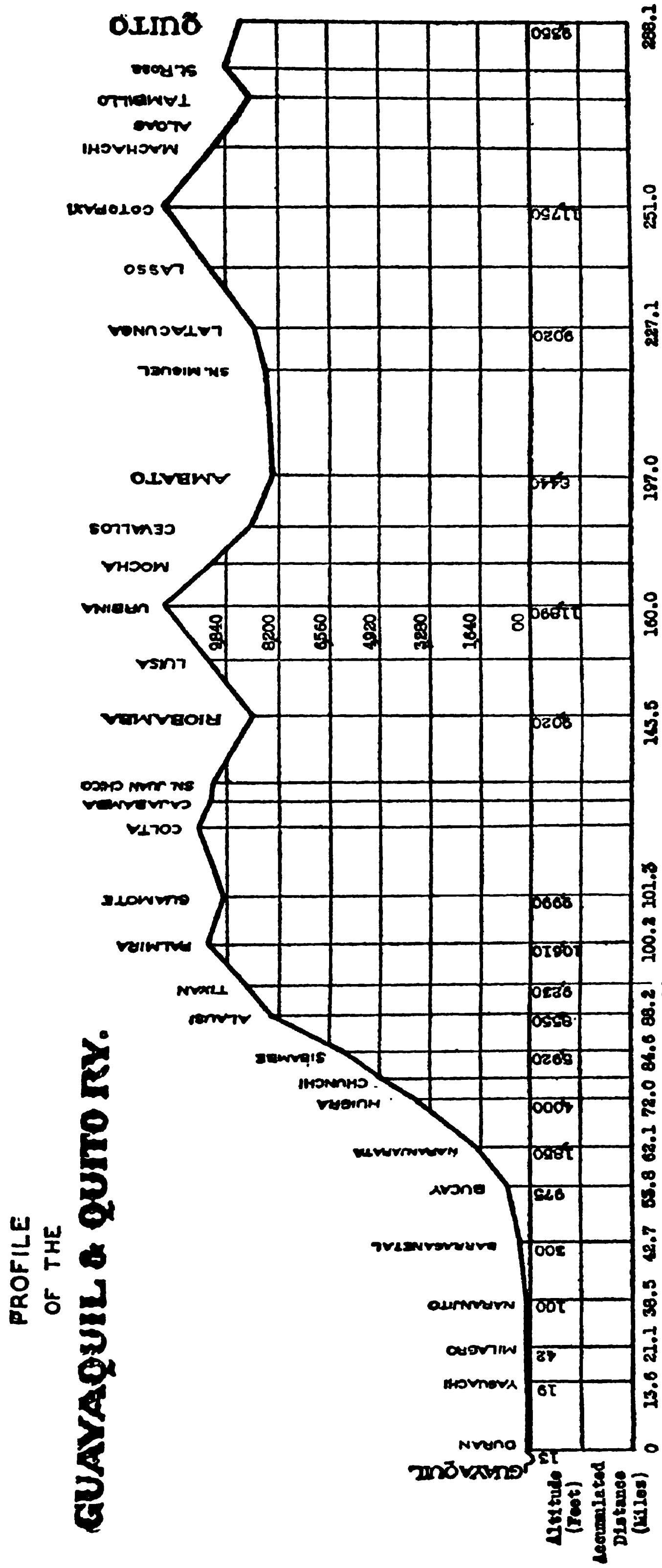
Guamote is a village approximately 10,000 feet above sea level. One case of plague is said to have occurred there in 1918, but there have been no other cases since then. However, the isolated Indian villages and haciendas near Guamote have suffered from plague a number of times. There were cases on the haciendas near Guamote in 1929.

Riobamba, with an elevation of 9,020 feet, has been invaded by plague only once, and that in November, 1929. This was a family outbreak originating in an old lady brought, while sick, from Pungala to her daughter's house in Riobamba. Ten relatives living in the same house or who came in from the outside to wait on her were taken sick with plague. No other cases occurred in Riobamba. The city has a population of about 50,000.

Ambato is only 8,440 feet above sea level. Plague was first reported here in 1916, or three years later than at Alausi. The disease has reoccurred at practically 3-year intervals ever since 1916. In 1926 there were 101 cases of plague in Ambato from February to June. Ambato has a population of about 10,000. The first cases of each epidemic have occurred in houses adjacent to the railroad yard and station.

Latacunga, elevation 9,020 feet, has never been invaded by plague, but the near-by village of Guaytacama, about 500 feet higher than Latacunga, had 53 cases of plague in 1926. The infection was introduced into this village by two individuals who came from Ambato

[2] The altitudes given here are those of the stations of the Guayaquil & Quito Railroad.



Altitudes of stations along the Guayaquil & Quito Railroad

while sick or in the incubation period. No cases have been reported in Guaytacama since 1926.

Quito, with an elevation of 9,350 feet, and the terminus of the Guayaquil & Quito Railroad, has never had a case of plague. It is a city of about 100,000 inhabitants.

CHARACTER OF PLAGUE EPIDEMICS IN MOUNTAIN COMMUNITIES

In Alausi and Ambato, in the years when plague is present, the first cases appear in February or March and the last in May or June. In all the towns on the railroad in the sierras the same seasonal prevalence is observed, but the cases in the small Indian villages or caserios and on the haciendas have a much wider seasonal variation than in the towns. In fact it is believed that cases occur in the isolated settlements throughout the year. They are known to have occurred from October to June. The actual number of cases in the small Indian communities is problematical, because the Indians rarely report illnesses, nor do they care for the services of regular physicians. It is only when several cases appear and the inhabitants become frightened that they voluntarily report cases. When burial certificates are applied for, information of a suspicious nature results in an investigation, and plague is often discovered as the cause of death or other cases are found. In the mountain towns plague has a very limited existence, while in the villages and haciendas the disease persists much longer, although not, as a general rule, in the same place, but in the near-by communities. Transmission in the places where the disease persists the longest is rather direct from man to man, as in the small epidemic reported at Riobamba and at Guaytacama, and not through an intermediary host, as the rat.

SPECIES OF RATS FOUND IN DIFFERENT SECTIONS OF ECUADOR

In Guayaquil under normal conditions 75 to 80 per cent of the rats trapped are *Rattus norvegicus*, 15 to 20 per cent *Rattus rattus*, and 5 to 10 per cent *Rattus alexandrinus*. It is realized that the last two species are practically one and that they readily interbreed, with the result that families of young rats can be classified under both headings, and sometimes it is difficult to say whether a particular rat is *rattus* or *alexandrinus*. Hereafter in this report the term *R. rattus* will include both unless *R. alexandrinus* is specifically mentioned.

In the towns of the Sierras *Rattus alexandrinus* is the predominating species, although *Rattus rattus* is nearly as common; but *Rattus norvegicus* is greatly reduced in numbers. In Table 6 are outlined the results of the monthly rat catch at the towns of Ambato and Latacunga. At Ambato from March to December the *norvegicus* rats varied from 38 to 15 per cent, with a total average of 27.7 per

cent. At Latacunga, which is about 600 feet higher in altitude and has a colder climate, there were two months when no *R. norvegicus* were caught, and the greatest percentage in any month of the 11 tabulated was 19 per cent. The average for the 11 months was 6.4 per cent *norvegicus*.

The relationship of the species of rats to the occurrence of plague is not clear. One might say that the reason plague has never invaded Latacunga was because of the small percentage of Norway rats found there, but this is not believed to be the correct interpretation. In Ambato, plague is most prevalent from February to June, the months with the greatest percentage of *norvegicus*, and the same is true at Guayaquil; but the increased percentage of *norvegicus* in the months of greatest plague incidence does not necessarily mean that these rats are responsible for the disease. It has been shown that in Guayaquil prior to 1916 the peak of the yearly epidemics occurred in the dry season before the rains increased the percentage of *norvegicus* in buildings.

There is a reddish brown wild rat in Ecuador which, in so far as is known, does not invade buildings. Several of these rats have been searched for fleas, but none could be found on them. At Guamote, three rats caught on an hacienda were unusual in type in that they had the body shape and size of *alexandrinus*, but the dark red coloring of the wild rat, and were evidently a hybrid produced by the mixture of these two rats. No fleas were found on them.

FLEAS FOUND IN ECUADOR, THEIR DISTRIBUTION AND RELATIONSHIP TO PLAGUE

Only three fleas have been encountered during the survey in Guayaquil, *Xenopsylla cheopis*, *Pulex irritans*, and *Ctenocephalus felis*. In the mountainous districts the following fleas were encountered: *Xenopsylla cheopis*, *Pulex irritans*, *Leptopsylla musculi*, *Ceratophyllus londinensis*, *Ctenocephalus canis*, *Hectopsylla suarez*, and *Rhopalopsyllus cavicola*. In Tables 7, 8, 9, and 10 is outlined most of the information obtained regarding the fleas found on rats and mice.

XENOPSYLLA CHEOPIS

As *X. cheopis* is the only rodent flea found on rats and mice in Guayaquil, and *C. felis* was only found at the rate of one per 150 rats and *P. irritans* seven times in over 4,000 rats, there can be no doubt as to the flea which transmits plague from rodents to man in Guayaquil. During the period covered by this report, the *cheopis* index was always in excess of that considered necessary for the continued transmission of plague. There are no accurate figures of the number of *cheopis* found per rat for the other months, but it is known that the tropical

rat flea is found in large numbers throughout the year in Guayaquil. A more detailed discussion of *cheopis* will be found later in this report.

Although little information has been obtained regarding the fleas found on rats in other coast towns of Ecuador, there is no doubt that the rodent flea infesting these rats is *cheopis;* but it is believed to be present in much smaller numbers than found on the rats in Guayaquil. Thirty rats were sent to the laboratory in Guayaquil from Duran in November and December. These rats had an index of 3.2. The only flea found on them was *cheopis*. The index in Guayaquil during the same months was 8 and 7.59, respectively. The same findings apply to Huigra which has an elevation of 4,000 feet. Of 19 fleas taken from 9 *alexandrinus* caught in Huigra and sent to the Guayaquil laboratory for classification in January, 1930, all were found to be *cheopis*.

An interesting finding regarding the presence of *cheopis* on guinea pigs from Huigra and from near-by haciendas was discovered during the months of January, February, and March, 1930. Of the fleas collected from 16 live guinea pigs in this area, 25 were *cheopis*, giving an index of about 1.5. This condition was not found in any other region and the only other place where *cheopis* was encountered on guinea pigs was at Alausi, and then only two were found on a much larger number of guinea pigs. Many guinea pigs sent to the Guayaquil laboratory from near-by haciendas have been searched for fleas without finding any species of fleas on them.

The data incorporated in Tables 7, 8, 9, and 10 were obtained chiefly from the records of the director of health at Quito. Some additional information obtained by personal observation has been included in these tables. Doctor Wandemberg, bacteriologist in charge of the Quito laboratory, is to be thanked for forwarding a large number of fleas from different sources to the laboratory in Guayaquil. The number of *cheopis* per rat as given in the tables is known to be excessive, except for those reported in Quito, and is due to the fact that when no fleas are found on rats no report is made to the laboratory in Quito, where all fleas are classified. Fleas are rarely found on rats in Ambato during the months of August, September, October, and November; yet the tables indicate a fairly high index during these months.

Although the *cheopis* index of rats in the higher altitudes is generally low, rats are sometimes found to be infested with large numbers of this species. For instance, 22 of these fleas have been found on one rat at Ambato, and in March, 1930, 22 were recovered from two Norway rats at Quito and 16 from one at Latacunga. These last two findings have not been incorporated in the tables. The finding of *cheopis* on rats in Quito in March is very unusual, in fact

these were the first to be found in three years. It appears very probable that these rats were imported from the lowlands.

During the four months from December, 1929, to March, 1930, the following personal observations were made of *cheopis* infestation of rodents in the high Sierras:

Alausi, altitude 8,550 feet: 19 rats, 11 *X. cheopis;* 13 mice, 1 *X. cheopis.*
Ambato, altitude 8,440 feet: 17 rats, 4 *X. cheopis;* 49 mice, 1 *X. cheopis.*
Latacunga, altitude 9,020 feet: 10 rats, 16 *X. cheopis.*
Quito, altitude 9,350 feet: 82 rats, 40 *X. cheopis.*
Guamote, altitude 9,990 feet: 3 rats, no *X. cheopis.*
Riobamba, altitude 9,020 feet: 11 rats, no *X. cheopis.*

In the data presented from the mountain section of Ecuador we have the extreme limits of climate at which *Xenopsylla* may reproduce or exist at all. In Table 8 it can be seen that not a single *cheopis* has been recovered from 129 rats from three places which have climates only slightly colder than that of Quito. The fact that *cheopis* has never been found in Riobamba clearly indicates that this flea can not exist here, because the chances of importing it are greater than in most other towns, as the trains from Guayquil lay over here at night. In Quito, *cheopis* manages to exist and possibly reproduces to a slight extent in certain months, while at Ambato and Alausi there is little doubt that this flea reproduces during part of the year at least. The presence of plague epidemics in Alausi and Ambato during the months when the *cheopis* index is the highest substantiates the claim that this flea must reproduce here in sufficient numbers, as indicated in the tables, to transmit rodent plague; while the noninvasion of Quito shows that *cheopis* is not present in sufficient numbers to produce a rodent epidemic. There is only about 2° difference between the mean temperatures of Ambato and Quito. It is probable that the mean temperatures play little part in determining the survival and reproduction of *cheopis;* and if the mean high temperatures did not reach 70° this flea would not be found in either place. It is during and following the months when the mean high temperatures are 70° or higher that *cheopis* is found most prevalent in both places. At Ambato, plague disappears in June and the *cheopis* index begins to fall. In June the mean high temperature is under 70° and continues under this point until October; but the mean temperatures are as high as those of Quito during the same months. In Quito the *cheopis* index reaches its highest mark during September and October, while the mean high temperature exceeds 70° F. only during the months of August and September. The mean low temperatures in Quito during these months are slightly lower than those of Ambato during the months when the *cheopis* index is falling. It is conceivable that the high day temperatures heat up the harboring places of the rats, and when the nests are in certain locations or materials the low night

temperatures do not cool them below the point at which the eggs and larva of *cheopis* may mature.

Both Ambato and Alausi have suffered severely from plague. The disease first appeared at Alausi in 1913 and at Ambato in 1916. In 1916 there were 167 cases of plague reported at Alausi, the greatest number ever reported in any mountain town in Ecuador. This was also the year of the greatest epidemic of plague in Guayaquil, following 1909. The disease no doubt spread to Ambato from Alausi, or both places were infected indirectly from Guayaquil. The plague season of both places corresponds, and it is at the time when *cheopis* is most prevalent on rats. When the epidemics of Alausi and Ambato occur the *cheopis* index of Quito is very low; in fact none of these fleas have ever been found on rats at Quito during the months of April and May.

X. cheopis is also found on mice at Alausi and Ambato, but has never been found on them at Quito. The average *cheopis* index of *Mus musculus* at Ambato is nearly as great as at Guayaquil. The finding of *cheopis* on mice is possibly an indication that these fleas reproduce in a community.

The gradual invasion of plague to the mountain towns probably parallels more or less the advent of *cheopis*. The Guayaquil & Quito Railroad was not open to Quito until 1908; and in a climate antagonistic to this flea it must have taken several years for it to become established in sufficient numbers to transmit plague. The persistence of *cheopis* at Ambato, Alausi, and Quito probably depends upon the more or less continuous introduction of these fleas on rats from Huigra and lowland towns. Upon questioning employees discharging freight cars it was learned that rats were frequently encountered in the cars, particularly those loaded with rice and sugar from the coast towns.

Plague appears at Alausi and Ambato in February or March, or following the onset of the rainy season. Rats no doubt seek shelter in railroad cars as well as in buildings to escape from the floods caused by the heavy rains in the coast district, and are then delivered in large numbers to the mountain towns.

In conclusion it may be said that *Xenopsylla cheopis* is the chief transmitting agent for plague in Guayaquil and other coast towns, in Huigra, Alausi, and Ambato.

CERATOPHYLLUS LONDINENSIS

Ceratophyllus londinensis was found on both rats and mice at altitudes of over 8,000 feet. It was not found on rats caught at Huigra, altitude 4,000 feet. It was the only flea found on rats and mice at Riobamba, but the infestation of rodents was very slight here. The index of *C. londinensis* was greater at Ambato than in any other place in the Sierras, but averaged only about two per rat. Rats caught at Alausi were only slightly infested with this flea. From the low degree

of infestation of rodents and the distribution of *Ceratophyllus londinensis* there is little reason to believe that it plays any part in the transmission of plague or if it does it is a very minor agent.

LEPTOPSYLLA

With the exception of Huigra and Riobamba *Leptopsylla* were found on rats and mice in all the mountain towns. The mice had a greater degree of infestation than the rats. It is the most common rodent flea of Guamote and Quito, places at which plague has never occurred to any extent. *Leptopsylla* is less commonly encountered at Ambato than in towns that have little or no plague. It is not probable that *Leptopsylla* are involved in the transmission of plague.

RHOPALOPSYLLUS CAVICOLA

Rhopalopsyllus cavicola is a flea found in South America as far south as Argentina. Its host in Ecuador is the guinea pig. It is found to some extent on tame rabbits and on rats and mice, but only occasionally, as is noted in the following observations made during December, 1929, and the first two months of 1930:

Guamote: 3 rats, 1 *R. cavicola.*
Quito: 62 rats, 2 *R. cavicola.*
Ambato: 14 rats, 1 *R. cavicola;* 170 mice, 2 *R. cavicola.*
Riobamba: 1 rat, 1 *R. cavicola;* 5 mice, 8 *R. cavicola.*
Latacunga: 7 rats, 2 *R. cavicola.*

This flea is found in great numbers on guinea pigs throughout the mountainous region of Ecuador. It was found at Huigra, 4,000 feet above sea level, and at Guamote, approximately 10,000 feet in altitude. Guinea pigs reared in houses are very heavily infested, while those taken from out-door pens were found to be free from fleas in several instances.

Throughout this study of plague in Ecuador the possibility that *R. cavicola* might transmit plague has been constantly kept in mind. The suggestive history of all the guinea pigs in a house dying of plague before or after human cases seemed to indicate that this flea transmitted plague between guinea pigs and to man. In most instances, if not all, in which guinea pigs died of plague, the localities were in the vicinity of Huigra, Alausi, and Ambato, or localities in which *cheopis* is found, as has already been mentioned. It is believed that plague would be much more prevalent in the mountain districts if *R. cavicola* were an active transmitter, because of the enormous number of this species liberated by the deaths of all the guinea pigs in a house. Furthermore, *R. cavicola* is found in large numbers at Latacunga and Quito, places that have not been invaded by plague. The raising of guinea pigs in houses is not confined to the

small Indian villages and haciendas, but is also practiced in the towns where the plague epidemics appear to be regulated by the *cheopis* index, as at Alausi and Ambato.

The following experiments were carried out to determine whether or not *R. cavicola* could transmit plague from guinea pigs to man and rats or between guinea pigs.

(1) Six guinea pigs infested with *R. cavicola* were brought from Alausi to the laboratory in Guayaquil. Four of these died in less than 24 hours, however, leaving only two to work with. These two were inoculated with plague; and when they died, a single guinea pig, in a small wire cage, was placed close to one of them, and another guinea pig and two young rats near the other, to collect the fleas from the dead animals. Both dead guinea pigs were found to be macroscopically and microscopically positive for plague.

After waiting 9 days from the day of exposure, the two rats and one guinea pig were killed with cyanide and the other guinea pig after 11 days. The dead animals were searched carefully for fleas. No fleas were found on the two rats, and only one flea, *R. cavicola,* was found on the guinea pig exposed nine days before; but from the other guinea pig 40 *R. cavicola* were collected. None of these animals presented any evidence of plague infection; but in order to be certain that they were negative, other guinea pigs were inoculated with spleen emulsions. None of these latter animals became sick within 15 days.

Although the climatic conditions of Guayaquil are unfavorable for *R. cavicola,* the negative result obtained in the case of the guinea pig from which 40 of these fleas were collected is strong evidence that *R. cavicola* is not a very active transmitter of plague.

(2) Doctor Wandemberg, at Quito, in a climate suitable for *R. cavicola,* was able to keep these fleas alive in test tubes for only three and four days. He also made 25 attempts to induce the *R. cavicola* to bite man when placed on the forearm. Only one flea made any effort to withdraw blood, and this one did not succeed.

Until other evidence is produced contrary to the above experiments, the *R. cavicola* can not be considered an agent in the causation of human plague in Ecuador.

R. cavicola is not found on the guinea pigs or other animals in the coast region of Ecuador.

HECTOPSYLLA SUAREZ

Hectopsylla are somewhat peculiar in appearance, and are encountered most frequently on guinea pigs in the high altitudes of Ecuador. One of these fleas was found among a collection of rat fleas from

Quito. During four months *Hectopsylla* were encountered as follows: 33 from 14 guinea pigs at Guamote; 1 from guinea pigs at Riobamba; and 14 from guinea pigs at Nisac, a small Indian settlement near Alausi. Plague has been present several times at the latter place, but the others are practically immune to the disease—at least it has never been known to spread in them. *Hectopsylla* are not present in sufficient numbers on guinea pigs to be of any consequence in the causation of plague in the mountain districts nor are they found in localities where the disease is most prevalent.

CTENOCEPHALUS FELIS AND CANIS

C. felis and *canis* are found occasionally on rats. None has ever been found on mice. They are not present in sufficient numbers on rats to be implicated in the transmission of plague. The greatest number found on one rat was 30, and this was a very exceptional case. *R. rattus* was very seldom found infested with *C. felis.* The Indian Plague Commission was unable to transmit plague with these fleas, and there is no reason to believe that they play any part in the causation of plague in Ecuador.

PULEX IRRITANS

Pulex irritans is one of the pests of Ecuador. It is found everywhere, on the coast and in the high mountain districts. Every Indian blanket and the blanketlike poncho worn continuously by the mountain Indians is an ideal harboring place and hatchery for these fleas. In December, 1929, 45 *P. irritans* were taken from three Indian blankets, from different Indian houses, in about 15 minutes, and more could have been secured by further search.

This flea is rarely found on rats in Guayaquil. Only seven were found during this survey, and five of these were recovered after the onset of the rainy season. In the mountain districts it is found much more frequently on rats; 48 were found on 83 rats at Quito. It was never encountered on mice at Guayaquil, but four were found among the fleas collected from mice at Ambato. The records of the Department of Health of Quito show that it is very common on rats in the mountains.

P. irritans has not been encountered on guinea pigs as frequently as one would expect, considering that these animals are raised in the flea-infested Indian houses. Only eight were found among fleas taken from over a hundred guinea pigs.

A large number of fleas taken from the clothing of mountain Indians have been classified, but *P. irritans* was the only species found from these sources.

The Indian Plague Commission demonstrated that *P. irritans* was capable of transmitting plague between rats and guinea pigs, and

other workers have found them able to transmit plague. Several different writers have reported that cases of human plague were probably produced by this species. By the process of elimination, one is compelled to believe that *P. irritans* is the chief transmitting factor in the causation of plague in the localities in Ecuador where no *X. cheopis* are found and it is probable that some of the cases in Guayaquil and other communities are produced by this flea.

There are a number of other reasons for believing that *P. irritans* is responsible for many cases of plague as outlined below:

(1) The large number of *P. irritans* found in Ecuador makes it very probable that some cases of plague are transmitted by these fleas, as they are known to have the power to transmit the disease.

(2) There is no doubt that "angina pestosa" is caused by the Indian habit of killing vermin with their teeth. Therefore either *P. irritans* or lice are the cause of this form of plague, as both are killed, when caught, by biting them.

(3) "Viruela pestosa," or vesicular plague, is a form that is probably caused by some other agent than the usual one, *X. cheopis*, or it would be found more frequently in other countries. In the small epidemic at Riobamba, in which 3 out of 11 cases were this type, the transmitting agent could not have been *cheopis*. *Pediculus corporis* are not found in Guayaquil where the vesicular type of plague occurs, nor in the mountains. The only other flea found in Guayaquil besides *P. irritans* is *C. felis*, which is probably not concerned in plague. We are therefore limited to *P. irritans* and *Pediculus capitis* as the possible transmitting agents of "viruela pestosa."

(4) The low death rate among the mountain Indians indicates that an unusual factor is involved in these cases. This point was well illustrated by the small Riobamba epidemic, when only 3 out of 11 cases died and one of these was a very old woman, while the other two were the unusual forms of plague. None of the five secondary bubonic patients died.

(5) The direct person to person transmission of plague among the mountain Indians points strongly to the human flea as being involved, although lice can not be ruled out on this score, because the Indians are infested with *Pediculus corporis* and *capitis* as well as *Pulex irritans*. That plague was transmitted from person to person in the small epidemic at Riobamba when the 11 cases followed exposure to the old woman brought sick from Pungala and in the epidemic at Guaytacama in 1926 following the arrival of two individuals from Ambato who were taken sick with the disease, can not be disputed. Furthermore, the part played by the Indian death ceremony, or velorio, in the causation of plague in districts in which *X. cheopis* is not found, indicates the same person to person contagiousness.

It might be argued that *cheopis* was carried by man from place to place, but it is improbable that one individual would carry enough *cheopis* to infect 10 others, or that two persons would carry a number sufficient to cause 53 secondary cases as reported above.

In this discussion we find that we are limited to either *Pulex irritans* or *Pediculus* as the transmitting agent in the causation of plague in localities in which *X. cheopis* is not found, and there is some evidence ruling out *Pediculus corporis;* therefore we have to choose between *Pediculus capitis* and *Pulex irritans.* The latter is known to be capable of transmitting plague, while the possibility that *Pediculus capitis* carries the disease is entirely problematical. There is experimental evidence showing that when lice have been fed on plague-infected individuals and their bodies ground up and injected into animals, plague may be produced; but this does not indicate that the louse can transmit plague under normal conditions. It is entirely possible that some cases of the anginal form of plague may be produced by crushing lice between the teeth as well as by killing fleas in the same mann r. Until there is more evidence in favor of the louse it is believed that *P. irritans* should be considered the chief transmitter of plague in localities in which *X. cheopis* is not found, and that it also causes some of the cases in Guayaquil. It is not believed that *Pulex irritans* can keep the disease alive indefinitely, and if new cases were prevented from entering the zone in which *cheopis* is not found, this area would soon become free from the disease, although it seems to persist here longer than it does in the more crowded towns, like Ambato and Alausi, in which *X. cheopis* exists in considerable numbers only from February to June.

XENOPSYLLA CHEOPIS INDEX OF GUAYAQUIL

GENERAL CONSIDERATIONS

This study of the flea infestation of rodents at Guayaquil, Ecuador, began September 24, 1929, and ended March 31, 1930. During this time fleas were taken from 5,105 rats, as follows: 29,075 *X. cheopis*, 187 *Ctenocephalus felis*, and 7 *Pulex irritans*. During the same period, 841 *X. cheopis* were found on 3,733 of the species *Mus musculus*. *Xenopsylla cheopis* was the only rodent flea fround on either rats or mice.

In compiling the tables of this report and in formulating conclusions, the data obtained from 1,357 rats caught from September 24 to October 28 have not been included, because of the change in the method used to take the fleas from the rats on the latter date. The total *cheopis* index for this period was 2.75. During the entire period the same two persons did all the work connected with this study.

Whenever a cage contained more than four rats of the same size under one-half grown, the excess over four were discarded, thus limiting to a certain extent the number of very young rats, because more young rats are caught in cage traps than old and the inclusion of all would have completely overshadowed the data. Even when this means was taken to reduce the young rats, 57 per cent of *R. norvegicus* were less than one-half grown.

Tables 11 to 38 present data dealing with all phases of the *X. cheopis* index as determined by this study. The only table in which the findings for the last four days of October appear is Table 11, and here the results are tabulated under the month of November.

There is reason to believe that the data throughout this report are affected by the constant use of poison to kill rats and all interpretations must be made with this in mind.

The microscope was used throughout the work for the determination of species and sex of fleas. The lowest lens of the low power objective was removed, because the magnification was great enough without it and examination was made much more rapid.

When fleas were removed from rats they were placed in Petri dishes containing pure carbolic acid solution and allowed to clear until the next morning. The differentiation was made in the same Petri dishes.

The *cheopis* index was found to be quite variable, fluctuating greatly from day to day, depending on the nature of the place where the rats were caught, as well as their size, sex, and species; but the former condition affected the index the most. It can readily be understood that the index of a locality is likely to be very misleading unless rats are included in about equal numbers under the different conditions in which they live in the community.

This study has been greatly handicapped by lack of information regarding the number of *X. cheopis* in other years when poison was not in use. Furthermore, the rainy season was much shorter than usual and the rainfall was about one quarter of that of an average year, so that the effects of the longer and damper ordinary year were absent.

COLLECTING FLEAS

From September 24 until October 24 the method used for collecting fleas continued to be the same as had been in use for some time and which consisted in drowning the rats in glass jars and then searching the dead wet rat for fleas.

After observing this method for a month it was believed to be unsatisfactory, because too much reliance was placed on the eyesight of the searcher, especially when the rats had thick hairy coats nearly the same color as the fleas. In taking the rats from their

cages they were seized by the throat and strangled, thus causing them to struggle violently, with the result that some of their fleas might be shaken off. Live fleas were frequently found on the dead wet rats, and some of them eluded the searcher, not only entailing the loss of the fleas, but also subjecting the workers to the possibility of being the hosts of plague-carrying fleas. It required much time properly to search a wet rat for fleas, and after three or four hours the searcher becomes tired and careless.

On October 24 the method of killing rats was changed by using cyanide, and the fleas were removed by combing with a fine-toothed comb. The number of fleas obtained by combing was slightly greater than by the old method, but combing was found to be even more time-consuming, and it required the greater part of the day to complete the search, so that the rats were not available for the morning autopsy and on account of the climate could not be kept until the next day. During the course of the day's work on October 27 it was discovered that, when it was thought that all fleas had been removed by combing, still more could be recovered by holding the rat by the tail and striking it with the blade of large dressing forceps. This observation was put into use thereafter and proved very satisfactory.

The method used for collecting fleas, upon which practically all the data in this report are based, was as follows:

The containers in which the rats were killed were 24 ordinary glass jars of 1 gallon capacity such as are used for displaying candy, drugs, and other articles in stores. They have so-called ground glass tops and wide mouths.

Hydrocyanic acid gas was used to kill the rats. It was generated in ordinary flat 4-ounce ointment tins, in the covers of which five or six holes had been punched with a small nail. It was uncertain at first whether the ordinary ointment tin would withstand the action of the acid long enough to be practicable. They were found to be entirely satisfactory as they did not have to be renewed oftener than once every two or three months. If the tops are not removed daily they will be sealed by the action of the acid, so that they can not be taken off without injury to the tin.

Both sodium and potassium cyanide were used for generating the hydrocyanic acid gas. Two or three large lumps of cyanide will last two or three weeks without renewing. Pure commercial hydrochloric acid was found more satisfactory than when diluted with water, because there was practically no solution left in the tin when the pure acid was used. Each morning a few drops of commercial hydrochloric acid was placed on the chemicals in the tins and quickly covered and returned to the jars. An ordinary medicine dropper was used for handling the acid. The jars could be charged with the

poison gas two or three hours before being used, and they never had to be recharged the same day. The same jar was frequently used two or three times in a day to kill rats.

The cyanide was used in a small screened room open on two sides. It can be used safely in any well-ventilated room, but of course not in a closed space. There is absolutely no danger to those using this method if ordinary precautions are taken necessary for handling hydrocyanic acid. Masks are not necessary. One must work quickly when placing acid on the chemicals, not only to avoid breathing the generating gas, but also in order to return the ointment tins to the glass jars before the gas escapes. The most uneducated laboratory worker will soon learn a proper respect for and the procedure necessary in safely handling hydrocyanic acid gas when he sees the effect it produces upon rats placed in the jars.

Rats were brought to the laboratory in the traps in which they were caught. No covering was used to prevent the escape of fleas. As most mornings were cloudy, little protection from the sun was needed.

When the trappers arrived with the rats they gave the information that was necessary for the survey. This consisted of the street address, the number of the city block, and the nature of the place where the rat was caught. For the latter purpose a large wall map with each city block numbered was referred to. The tag with the above information was placed under the first empty jar in the series and then the rats were removed from their cages. They were seized by the loose skin on their backs with 12 and 14 inch heavy dressing forceps and placed in the glass jars. Most of the rats could be taken in this way with very little struggling. When the cages contained different sizes and sexes of rats, they were separated in the jars. Rats less than one-half grown were not separated according to sex. Adult rats were usually placed in separate jars even when of the same sex.

After the rats had been transferred to the glass jars, cards were completed for each jar, on which was recorded the information already given, to which was added the date, size, sex, and species of the rats.

When large rats are first placed in the jars it is necessary to hold the tops down or they are likely to be knocked off by the convulsions caused by hydrocyanic acid. The action of the gas is so rapid that most rats are dead in about 30 seconds. When the same jar has been used two or three times or three or four rats are treated in one jar, the concentration of the gas is lowered so that it may then be several minutes before the rats finally expire.

Fleas are killed more quickly and by a lower concentration of gas than are rats. In fact, during the course of this work, rats that were placed in jars containing small percentages of hydrocyanic acid have been removed when unconscious but still alive, their dead fleas and lice were removed, and then the rats allowed completely to recover from the effects of the cyanide. When the amount of gas in the jars becomes low, some of the fleas are found loose from the rats. It is necessary to inspect each jar for fleas after removing the rats. Ordinarily no fleas get separated from the rats, and many times not a single loose flea was found during the course of a day's work.

After the cards have been completed for the rats on hand, the rats are taken from the jars and the fleas removed. The first step consists in seizing the rat at the root of its tail with the long dressing forceps and holding it over a large white enamel bowl, 18 inches in diameter at the top and 8 inches deep, with sloping sides. To remove the fleas the rat is struck downward glancing blows with a blade of the same kind of forceps used in handling them. The rat is supported to a certain extent against the sloping sides of the bowl while being struck, scraped, and "combed" with the blade of the dressing forceps. Sometimes the first few blows produce no apparent results, but they loosen up the fleas, which will soon begin to fall like corn being knocked off the cob. Precaution must be taken not to crush more fleas than necessary. It is surprising how few fleas are injured by this rough treatment; at least this applies to the experience in Guayaquil. Very rarely are the fleas so crushed that their sex and species can not be determined. When cut in two parts, usually both halves can be found. When rats are heavily infested, the fleas can be knocked off faster than an assistant can remove them from the pan.

After all fleas are believed to have been knocked off the rat is turned over to the assistant to be combed and the dirt and hair to be removed from the bowl by rubbing it with a wadded piece of newspaper.

Combing the rat has been greatly facilitated by putting it through the above process, especially the shedding *norvegicus* and the long-haired *rattus*, because a large amount of the hair is knocked off as well as the fleas. Very few fleas are found by combing, but a sufficient number are recovered to warrant continuing this procedure.

Removing fleas by the method just outlined is much more rapid than the two processes first used. From 30 to 45 rats can be received, killed, ticketed, and their fleas secured in two to two and a half hours by two workers. In the case of two young rats that harbored 256 *X. cheopis*, all the fleas were secured in about 10 minutes. When rats have few fleas the work is much more rapid.

The following table gives a comparison of the results obtained by the three methods described. The figures given in the table are for nine consecutive days, three for each method. The rats were caught in the central section of the city.

Method	Number of rats	X. cheopis				
		Number	Males	Females	Index	Per cent females
Drowned and searched	274	606	340	266	2.21	44
Killed with cyanide and combed	114	393	185	208	3.44	53
Combined scraping and combing	154	1,082	624	458	7.02	42

It will be seen in the above table that the *X. cheopis* index was more than doubled when the procedure of knocking the fleas off the rats was adopted. The large percentage of females found by combing was no doubt due to the fact that the female is much larger than the male and consequently relatively fewer males were found when the rats were only combed. Unless conditions are abnormal for *X. cheopis* in a locality where fleas are obtained, any method which gives a larger number of females than males should be investigated to determine whether all the fleas are being removed.

On account of the great variation in the results of the three methods used to remove fleas from rats, only the figures obtained since the adoption of the last process are given in this report.

SIZE, SEX, AND SPECIES

Little discussion is required to supplement the information contained in the tables regarding the *cheopis* index as found for rats of different sizes, sex, and species.

Adult males of both *R. norvegicus* and *R. rattus* have a slightly higher index than the females. At the beginning of the investigation *norvegicus* males had a slightly greater index than the females, but during the last three months the female index was slightly greater. It is curious to note that the total *cheopis* male index is exactly the same for adult Norway males and females. The greatest variation between the sexes occurred in the group of young *norvegicus* one-half to two-thirds grown. Here the male averaged nearly one more flea per rat. Rats over two-thirds grown are considered as adults in this report.

In Tables 15 and 19 are tabulated the indices for rats according to size. Among the *norvegicus* the rats one-half to two-thirds grown had the greatest index and adults the least. These figures do not hold good for *R. rattus*, the adults of which were found to harbor the greatest number of *cheopis*.

In Table 22 an analysis has been made of the flea infestation of rats less than one-half grown caught during the months of November and December. It will be seen in this table that the smallest rats or those that still harbor in the vicinity of the nesting place where they were born have the greatest flea infestation in the case of both *norvegicus* and *rattus*. As the rats increase in age, the flea index gradually decreases until the half-grown stage is reached, when the index increases again. At least this is true for *norvegicus*.

In Table 20 is outlined a comparison of the findings for *rattus* and *alexandrinus*. As one would expect, there is little difference in the flea infestation of these rats.

It will be seen in Table 21 that *rattus* averaged over one flea more per rat than *norvegicus*. The following data taken from the records of this survey prove that *rattus* harbors a greater number of *cheopis* than does *norvegicus*.

(1) In 100 blocks in which both *norvegicus* and *rattus* were caught, 865 *norvegicus* had an index of 4.82 and 261 *rattus* an index of 6.49, or an average of nearly two fleas greater per rat.

(2) There were 62 premises where both species were caught, with the result that 331 *norvegicus* had an index of 4.13 and 113 *rattus* an ndex of 5.82, or again a variation of nearly two *cheopis* per rat.

INDEX OF DIFFERENT ESTABLISHMENTS

In Table 23 will be found a list of some of the establishments in which rats were caught and the relative *cheopis* index for each. The figures given in this table are not as valuable as those for many other localities, because all classes of businesses occupy only the first floor of buildings, the upper floors being living quarters, and rats have a more or less free run of the solidly built blocks because of the tropical Spanish construction of the buildings. It appears that several classes of establishments have as great flea infestation of their rats as places where rice and other grains are sold or even greater. It should be noted that the rats caught in the open, as on wharves and in lumber yards and coal yards, have a *cheopis* index of one-half or lower. There are no storage warehouses on the wharves of Guayaquil.

ZONE INFESTATION

It is rather difficult to divide most cities into definite zones, and in Guayaquil it is an impossibility, because there is hardly a block in Guayaquil that does not have several places where foods or other kinds of stores are sold. Shacks and buildings of the best class of construction are often found side by side.

In Tables 24, 25, and 26 are given the findings for the best zoning possible in Guayaquil. Table 24 gives the data obtained for a com-

posite area of 15 blocks made up of old wooden buildings the ground floors of which are occupied by stores selling and storing rice and other grains and food products. The *cheopis* index of this section, 10.23, is approximately one-third greater than the area of general business houses and better residential sections, and over twice as great as that of blocks composed chiefly of shacks. The index of the better residential section, 7.33, is about one-third greater than that of the poorer section of the city.

Another thing that arrests the attention in looking over the tables is the number of rats caught per block in the different sections. This figure for the different areas was 33 per block in the grain section, 20 per block in the general business section, and only 4.7 per block in the poor area. These figures seem to indicate that the *cheopis* index varies nearly in proportion to the degree of rat infestation.

VARIATION OF THE X. CHEOPIS INDEX IN DWELLINGS

In December an inspection was made of the buildings in the central part of Guayaquil to determine, if possible, the cause of the great variation in the number of *cheopis* found on rats caught in neighboring houses and blocks. After looking the situation over it was decided that the type of building in which the rats were harboring might affect the *cheopis* index, and the survey was completed along this line, as follows, dividing the buildings into four groups, A, B, C, and D:

A. Modern cement constructed buildings.
B. Relatively new or remodeled wooden buildings.
C. Old wooden buildings in which people lived in the congested tenementlike manner.
D. Shacks that were largely constructed with bamboo sides and were generally in need of repairs. The chief harboring place for rats in these structures was under their raised floors.

Not enough rats had been caught in Class A buildings to draw any conclusions regarding their flea infestation, but on the other hand this finding showed the relative freedom of cement buildings from rats.

The *cheopis* index as determined for the other structures was as follows:

Class B, 45 buildings, 173 rats, index 7.37.
Class C, 62 buildings, 171 rats, index 8.79.
Class D, 71 buildings, 172 rats, index 5.24.

It is apparent from the above data that buildings offering the greatest rat harborage within them have the highest *cheopis* index. The index is excessive in both types of wooden buildings, so that the fact that plague is most prevalent in Class C buildings must be due to the congested unhygienic conditions under which they are occupied.

Following the above survey on the 1st of January a record was kept of whether rats were caught in huts or in the better constructed buildings, and also whether they were caught on the ground floors or upper floors of the better type buildings. At that time it was not known what difference would be found in the flea infestation of rats caught on the lower and upper floors of dwelling houses. It was believed that more rats invading houses from outside harboring places and from underneath the lower floors would be caught on the ground floors than on the upper floors, or that the flea infestation of rats caught on the lower floor would be comparable to that found in the 1-story huts. The results obtained, as will be seen in the following discussion, more than repaid the trouble necessary to secure this information. It should be realized that some of the rats caught on the ground floors have their harboring places in the upper floors and that in certain instances the same type of harboring place will be found on the ground floors of houses and in the shacks as are present in the upper stories of buildings. Some of the rats caught on upper floors come from the ground floors and also from outside harboring places.

THE EFFECT OF THE LOCALITY IN WHICH RATS ARE CAUGHT ON THE TOTAL INDEX

It has previously been mentioned that the chief factor affecting the *cheopis* index of a community is the location in which the rats are caught. As we have better information on this point in the case of rats caught in dwelling houses than any other place, the index of these rats is used in proving this point. In Table 27 is tabulated the percentage of the total number of rats caught each month in houses, the total *cheopis* index, and the index for dwellings. It can readily be seen that the total monthly index has been increased or lowered, as the case may be, by the rats caught in houses, as these compose over 50 per cent of the rat catch each month but the first.

For instance, if we take the month of March, which has the low total index of 5.97, and analyze it we find that 56 per cent of the rats caught that month come from dwelling houses and had an index of only 5.02, while the index of the smaller per cent of rats from all other locations was in reality 7.15, so that the total index has been overshadowed by that of the rats from dwellings. Referring to Table 28, we find that only 20 per cent of the Norway rats were caught on the upper floors of buildings, and that they had the high index of 9.76, while 80 per cent of the rats in dwellings came from ground floors and shacks. These rats had an index only slightly over 3, thus causing the low total index of the rats from houses. In other words, the low total index of the month of March depends

chiefly on the fact that most of the rats caught then came from ground floors and shacks.

Cheopis index of rats caught on upper floors of dwellings.—It is regretted that information was not obtained regarding the *cheopis* infestation of rats caught on the upper floors of houses throughout the period of this survey. However, the information available, covering the months of January, February, and March, is the most valuable, because it is during these months that the total *cheopis* index fluctuates the most. In Table 11 the total index for the months named above was 4.73, 7.02, and 5.97, respectively; while during the same period the number of *cheopis* found on rats caught above the ground floors of houses varied hardly any in the case of *norvegicus* during January and February, although there was an increase in the index in March. It seems that the conditions responsible for the variation in the three months under consideration did not affect the rats on the upper floors of buildings to any extent, or that the conditions under which *cheopis* lives and multiplies on the upper floors of buildings was not subject to the changes prevailing in other locations.

Cheopis index of rats living under and outside of buildings.—In all, 81 rats were caught in places outside of buildings, such as gardens, wharves, lumber yards, etc., and found to have a total *cheopis* index of only 0.28. Many of these rats were caught during the months when the total index was at its highest level. Furthermore, an inspection was made of a saloon, a hospital, and a hotel in which 153 rats were caught and found to have the low indices of 0.76, 1.80, and 1.31, respectively. Most of these rats were caught during November and December, when the general index was high. The inspection showed that most of the rats obtained from the above sources were invaders from outside the building. In the case of the saloon, there was only one rat run which led underneath the building next to it. The saloon had a concrete floor. The hospital was a modern concrete building with practically no inside harborage, and the hotel had a concrete floor. Rats were invading the kitchen of the hotel from outside sources.

Referring to Tables 28 to 32 we find that both *norvegicus* and *rattus* caught on the ground floors of buildings and in the 1-story shacks have a very low *cheopis* index as compared with rats caught in most other situations except those known to be harboring out of doors. The shacks have little inside harborage, as a rule, and there is no doubt that rats caught on the first floors are invaders from outside in many instances. It should be mentioned that although all the stores and other establishments in Guayaquil occupy the first floor of buildings, the conditions in them are not comparable to houses, because of the harborage places offered by their contents. In Table 31 it can be

seen that from 20 to 46 per cent of the rats caught on ground floors and in shacks during the different months were found free from *cheopis*, and that 70 per cent caught on ground floors had four fleas or less, while 72 per cent from shacks fall under the same class. If the rats with good harboring places inside the buildings could be ruled out of these statistics, it would undoubtedly be found that those invading the buildings from outside would have a *cheopis* index of less than one.

The data just given seem clearly to indicate that rats, both *norvegicus* and *rattus*, living outside of buildings have a very low *cheopis* index—too low for the continued transmission of plague—and substantiates the claim that the house-dwelling rat is the reservoir for plague and that these rats have probably developed a greater immunity to the disease because of their constant association with it than the outside rats. Consequently, when these animals are forced to seek shelter from the floods of the rainy season the disease spreads rapidly among them and from them to man, and thus we find that human plague reaches it highest point with the onset of the rainy season in January and February.

It should be pointed out here that the harboring places of *norvegicus* are not confined to the lower floors, basements, sewers, and other places as is frequently stated. The number of this species caught on upper floors and their flea index shows that they dwell in the upper floors of houses as well as below ground and out of doors.

If the theory advanced above is correct, then one can say that the value of the rat proofing of buildings not only depends on the fact that it prevents inside harborage, but also that rats which may invade this type of building in seach of food will be unlikely to carry plague because of the few fleas with which they are infested.

RELATIONSHIP OF X. CHEOPIS INDEX TO THE DEGREE OF RAT INFESTATION

In general, it can truly be said that the *cheopis* index will vary in accordance with the number of rats infesting a city block or building, and that the number of rats will be proportional to the rat harborage and food supply, conditions usually best provided in grain warehouses and other places where food is stored. Evidence in support of the above statement has already been introduced in this report, and here a short reference will be made to certain findings which show that the number of fleas is not always proportional to the number of rats caught, as indicated by the following data for three different types of establishments:

Hotel A: 51 rats trapped, index 13.75.
Hotel B: 58 rats trapped, index 0.76.
Saloon A: 26 rats trapped, index 23.38.
Saloon B: 37 rats trapped, index 1.80.
Hospital A: 21 rats trapped, index 6.33.
Hospital B: 48 rats trapped, index 1.31.

The number of rats trapped as given above does not mean the total number caught with snap and cage traps, but only those brought to the laboratory alive for the determination of their fleas. It has already been explained that the rats caught in the B institutions were invaders and that these buildings had practically no inside harborage. In the case of the A buildings we have old wooden structures with innumerable hiding and nesting places in them and there is little doubt that the trapped rats resided inside these buildings. We may therefore say that the *cheopis* index will be proportional to the number of rats when they are harboring inside buildings which offer suitable places for flea reproduction.

RELATIONSHIP OF INDEX TO CLIMATIC CONDITIONS

The temperature is favorable for the reproduction of *cheopis* throughout the year. Hirst states that the most favorable range of temperature is between 70° and 80° F., with an optimum at about 75° F. The mean temperature of Guayaquil falls within these figures and only exceeds them by a fraction of 1° during March and April, as shown in Table 4. In Table 33 will be found figures giving the *cheopis* index and all available climatic conditions at bimonthly intervals during this study. It can be seen in this table that the first half of January was hotter than usual by about 2° and that the rainy season began late in January, and after February 26 the rainfall was slight. The short rainy season and light rainfall are not believed to have affected the *cheopis* index to the extent that occurs in an average year. The use of poison has also influenced the findings, due to climatic conditions.

In every table of this report, with the exception of the tables for rats caught on the upper floors of houses, there was a depression in the *cheopis* index for January which was followed by a marked rise in February. Table 33 shows that the first half of January was very hot, with a mean temperature of 82.1° F., and that with the onset of rain in the second half the temperature fell. The rains of January were light, and heavy rains did not begin until the first of February, to continue until February 26. It therefore appears that the heat of January caused the fleas to leave their hosts, affecting both male and female *cheopis;* but these fleas continued to live apart from the rats until the dampness caused by the heavy rains forced them to return to their hosts, thus producing the rise noted in the index in February. During the rains of February, more *C. felis* and *P. irritans* were found on rats, indicating that fleas will more readily attach themselves to any host when forced to do so by dampness. This may be a factor in the causation of plague during the rainy months, as *cheopis* may more readily attach itself to man at such a time.

It is evident that when rats have harboring places which protect them from outside weather conditions, as is noted in the findings for rats caught on the second floors of houses, the *cheopis* index will not be greatly affected, as found in the above situation.

From the tables reporting the findings during January, February, and March for the rats caught in the buildings affording poor weather protection, it appears that there was a marked reduction in the *cheopis* index of rats infesting these buildings during the months mentioned. In Table 26 it may be seen that the index fell from 6 to 4 in January; and instead of the rise noted in February in the other tables, there was a further fall in this month and a still greater reduction in March. There is little doubt that if the rainy season had been as long and severe during the time of this investigation as usual the reduction in the number of *cheopis* on the rats in the poorly constructed section of the city would have been much greater.

In studying spot maps of plague cases of Guayaquil it was found that during the months from May to October, when the disease is least prevalent and tends to disappear, practically all cases are confined to the central section of the city in which the two or three story wooden buildings are located, while in the large surrounding area made up almost entirely of bamboo huts or other shacks the disease is practically extinct. It therefore appears that the central section of the city is the endemic area in which plague is carried over the unfavorable season each year in the better constructed wooden buildings of two and three floors.

The explanation of the disappearance of plague from the section of the city composed of shacks or bamboo huts affording poor protection is no doubt due to the unfavorable conditions produced by the rainy season which reduces the *cheopis* index below the point necessary for the continued transmission of plague, and also the smaller number of rats infesting this area.

It has been pointed out that plague disappears each year at the lowland towns on the railroad and rivers. As these places are made up almost entirely of bamboo-constructed buildings similar to those in Guayaquil, and are subject to the same severe rainy season, the explanation of the disappearance of plague in them is the dampness as in Guayaquil.

At the beginning of this report, reference was made to the fact that only one case of plague had ever been reported in Naranjito, and that no cases have ever occurred at Barraganetal and Bucay. The latter place is a railroad division point, and trains often lie over here at night, thus subjecting it to the invasion of rats from other railroad points. These places lie in the rainy belt between Milagro and the mountains,

and there freedom from plague unquestionably depends upon the dampness found in this section of Ecuador.

It is believed that we are now prepared to state that excessive dampness and a mean temperature of about 80° is unfavorable for the reproduction of *Xenopsylla cheopis*, when prolonged for three or four months or longer, and the buildings in which rats harbor do not protect their fleas from these conditions. Plague will tend to disappear in any tropical community in which the climatic conditions are similar to those stated above.

CHEOPIS MALE AND FEMALE INDEX

Reports of flea surveys seldom include much information regarding the relative number of *cheopis* males and females; and it is believed that valuable information may be obtained by such a study in a community.

The male and female indices will be found in nearly all of the tables in this report. In Table 34 is listed the percentage of females found during the different months. The percentage varied from 40 to 50, and the general average was 45 per cent. There is little doubt that the percentage of female *cheopis* during this survey was increased by the use of poison to kill rats. This subject will be discussed in more detail later. Under normal favorable conditions for *cheopis* reproduction it is believed that the ratio of males to females should be about 60 to 40, because under favorable conditions the female is separated from its host more than the male for the purpose of depositing its eggs. Any variation from the above figures should be analyzed for the cause.

The presence of 50.3 per cent of the female fleas on rats during the month of February is explained by the dampness at that time. During the first half of February the female index was markedly higher than the male.

In order to determine the effects of favorable and unfavorable harboring conditions of rats on the percentage of male and female *cheopis* found on them, Table 35 was prepared. In the first section of this table are listed data regarding sex as found on rats harboring four or less fleas, which number is considered as indicating that the rats of this group were living where conditions that were not favorable for *cheopis*, regardless of the location in which the rats were caught. In the third section are listed the data found for rats with 10 or more fleas or the rats harboring where *cheopis* must have favorable conditions for living and reproduction. If the first section of Table 35 is compared with the last it will be found that during the months of January and February the per cent of females found on rats is generally greater when the conditions are unfavorable for the fleas than when they are considered the best. In February the female

percentage is practically the same, which indicates that dampness apparently affected the fleas in protected harboring places. In the first division of the third section, which is for rats caught above the ground floor of houses, the percentage of females is 40 in January and 41 in March; and, as stated before, this figure is believed to indicate conditions suitable for *cheopis* reproduction, while any variation in it as given in all divisions of the first section suggests that the fleas are existing under unfavorable conditions. It will be noted in the first section of the table, under "bamboo shacks," that the percentage of females did not increase in February, which probably is explained by the assumption that there were not enough fleas in the shacks to cause an increase.

In conclusion it can be said that when the percentage of female *cheopis* is over 40, these fleas are not existing under the most favorable conditions; and the higher the percentage, the more unfavorable the conditions.

EFFECTS OF POISON ON CHEOPIS INDEX

Mention has already been made of the belief that the use of poison for killing rats has affected the *cheopis* index throughout this report. There is no doubt that poison caused the deaths of many rats every month and that the greatest number were killed during the first three poisonings. Therefore, if poison affected the *cheopis* index the greatest effect should be observed during the latter part of October and in November and December. The tables present much evidence that the number of *cheopis* per rat was excessive at the beginning of this survey. For instance, the index for the first half of November in Table 33 was over eight fleas per rat and then fell until the second half of December, when it reached 8.5. During December the area in which the traps were located was covered twice with poison, and the number of rats caught per hundred traps reached a very low figure. Tables 15 and 19 show that the young rats one-half to two-thirds grown, or the less astute rats of both *norvegicus* and *rattus*, have an index of over 10 in November, which is never equalled again during the survey. This group of rats are the ones most likely to take poison. In Table 29 the rise in the *cheopis* index during March of both *norvegicus* and *rattus*, but particularly the latter species (which has an index of 26 fleas per rat), when caught on upper floors, must have been produced by the use of poison, because the *cheopis* index in general is falling in March.

In charting the curve of the *cheopis* index at 3-day intervals it was found that immediately following the completion of poisoning in the areas where the traps were located, there was a marked rise in the *cheopis* index following the first four poisonings. The highest point reached by the *cheopis* curve at 3-day intervals followed the

second poisoning, with the exception of a rise in March, due to the catching of two rats with 256 fleas on them. During January, February, and March the effects of climatic conditions overshadow the results of poisoning.

The effects of poison are even more marked on the number of female *cheopis* per rat than on the total index. From the data given in Table 33 it is found that the percentage of females in the last half of October was 42, in the first half of November 44, and in the second half of November 47. There were no climatic conditions at this time to cause an increase in the female *cheopis* index, and it is only explained by the release of fleas from dead rats. As the female *cheopis* is more used to separating itself from its host and then returning or going to another host, it is reasonable to suppose that this sex is more active in finding a new host if the rat upon which it was living is killed, thus accounting for the increase in these fleas when poison is destroying rats.

It can be concluded that the use of poison increases the total *cheopis* index and the percentage of female *cheopis* on rats, and that these findings in the laboratory may be useful in determining the effectiveness of poison.

The curve of the *cheopis* index of *Mus musculus* shows a marked rise following the use of poison, the same as that noted for rats.

PERCENTAGE OF RATS HAVING DIFFERENT DEGREES OF X. CHEOPIS INFESTATION

Tables 37 and 38 are interesting in that they show the percentage of rats having different degrees of flea infestation and the per cent of fleas found on these rats. They show the distribution of fleas on rats during the different months.

It will be seen in Table 37 that many rats were found free from fleas throughout this survey. During November and December the same percentage of flea-free rats occurred. In January there was a rise in the percentage of rats without fleas; in fact, from January 1 to 20 only 11 per cent of the rats had no fleas, but after the onset of the rainy season the percentage jumped to 28 for the remainder of the month. In February one-fifth of the rats had no fleas, and in March over one-fourth. It is evident that with the onset of the rains many of the rats driven for shelter into buildings from outside harboring places were free from *cheopis* infestation.

It is generally considered that a *cheopis* index of two or more is necessary to cause plague epidemics. From the figures given in Table 37 it was found that the following percentage of rats harbored two or more fleas during the different months: November, 71 per cent; December, 73 per cent; January, 61 per cent; February, 68 per cent; and March, 59 per cent. The figure for March indicates a marked fall in the number of rats which would be likely to transmit plague.

CHEOPIS INDEX OF MUS MUSCULUS

In Table 39 will be found the monthly *cheopis* index of *Mus musculus*. No other flea was found on mice in Guayaquil. This table is of interest, because it shows that *cheopis* is not found in sufficient numbers on mice for these animals to be considered any particular menace in transmitting plague. Three was the greatest number of fleas ever found on one mouse. Fleas were obtained from mice by drowning them and then searching the dead wet animal.

The high index of November is believed to have been caused by the use of poison, while that of February was no doubt due to the rainy weather. The mouse index did not fall in January or March as did that of rats, probably because they harbor inside of buildings in places better protected from the weather.

EPIDEMIOLOGICAL SUMMARY

(1) *Xenopsylla cheopis* is the flea chiefly concerned in the causation of plague in Ecuador. It is the only flea causing rat plague. If it were not for this flea, plague would soon disappear.

(2) *X. cheopis* is found at altitudes of over 9,000 feet, but not in sufficient numbers to cause plague epidemics.

(3) The highest altitude at which *X. cheopis* is implicated in the causation of plague epidemics is about 8,554 feet, the elevation of Alausi and vicinity.

(4) *X. cheopis* is the only rat flea found in the lowlands and in the mountains up to an altitude of 4,000 feet.

(5) The constant importation of *X. cheopis*-infested rats is probably necessary to maintain these fleas in sufficient numbers in the high altitudes for them to cause plague epidemics.

(6) *X. cheopis* may reproduce when the mean temperature is between 55° and 56° F., but a mean high temperature of about 70° F. or higher is necessary.

(7) *X. cheopis* can not exist at Riobamba, which has a mean temperature slightly lower than that of Quito, but also a lower altitude.

(8) Plague occurs in Ecuador at altitudes of over 10,000 feet above sea level.

(9) Plague does not persist in the mountain towns after June or the onset of the colder months, but does occur in the Indian villages and haciendas after it has disappeared from the larger railroad towns. Plague would not reappear in the mountain towns if they were not reinfected.

(10) By means of the Guayaquil & Quito Railroad plague-infected rats are transported from Duran to the other lowland towns and to the mountain towns. Duran is infected through the means of the constant ferry service between it and Guayaquil. The latter place is the source of all the plague epidemics in the central part of Ecuador

and the disease would disappear if not for the endemic center in Guayaquil.

(11) The floods in the lowland section of Ecuador cause rats to seek shelter in railroad cars, and they are then carried in large numbers to the mountain districts.

(12) Every year that plague has been present in Ambato it has first appeared in the vicinity of the railroad station.

(13) The endemic area for plague in Guayaquil is the section of the city in which is located the two and three-story wooden buildings.

(14) The dampness caused by the rainy season is the chief factor in reducing the *cheopis* index. The greatest effect of dampness is produced in buildings which are poorly constructed to protect their interiors from the effects of weather, such as buildings made of bamboo. Dampness does not affect the *cheopis* index of rats harboring on the second and third floors of houses or in warehouses as it does the index of those harboring in poorly constructed buildings.

(15) High temperatures will cause *cheopis* to leave their hosts, but do not kill them, at least not the temperatures of Guayaquil.

(16) Dampness forces fleas to seek their hosts or some other host if their natural one is not available.

(17) The disappearance of plague from the lowland towns outside of Guayaquil is due to the effect of dampness on the rats harboring in their bamboo-constructed buildings.

(18) Rats harboring outside of buildings in Guayaquil have a *cheopis* index too small to cause epidemics of plague among them.

(19) *Rattus rattus* and *rattus alexandrinus* have a higher *cheopis* index than *R. norvegicus*.

(20) The lessened incidence of plague in Guayaquil since 1916 is due to an immunity developed by the rat population.

(21) The immunity to plague is greatest among rats harboring within buildings, or the house rats.

(22) *R. norvegicus* lives on the second floors of buildings and may be caught there in large numbers.

(23) The shift of the peak season of human plague in Guayaquil from the last months of the dry season to the first months of the rainy season is due to the high immunity of the house rat and the lack of immunity of the outside rat, which is forced to seek shelter inside of buildings during the rainy season.

(24) Under normal conditions the percentage of *cheopis* females should be about 40%. Dampness, unfavorable rat harboring conditions for *X. cheopis*, and the deaths of many rats as produced by poisoning and as probably occurs when there is a rat epizootic of any kind, cause an increased number of *cheopis* females to be found on rats.

(25) The method of removing fleas outlined in this report has proved to be very satisfactory, and is much superior to simply combing rats to obtain their fleas.

(26) Very young Norway rats, one-sixth grown or younger, have a greater *cheopis* index than any other group of rats. The index gradually decreases until the rats are one-half to two-thirds grown and then increases. Adult *norvegicus* have fewer *cheopis* than young rats.

(27) The sex of rats is not an important factor in determining *cheopis* infestation.

(28) The data in this report is not typical in all respects, because of the influence of killing rats with poison on the *cheopis* index.

(29) Poison causes an increase in the total *cheopis* index and in the per cent of female *cheopis*. The efficiency of poison in killing rats may be watched in the laboratory by following the total and female *cheopis* indices.

(30) The nature of the harboring place of rats is a more important factor in determining the number of *cheopis* than the character of the place in which they are caught.

(31) The *cheopis* index varies in proportion to the number of rats when the rats are harboring inside of buildings.

(32) The following fleas were found during this survey in Ecuador: *Xenopsylla cheopis, Pulex irritans, Ctenocephalus felis* and *canis, Rhopalopsyllus cavicola, Hectopsylla suarez, Leptopsylla musculi,* and *Ceratophyllus londinensis.*

(33) *Pulex irritans* is the only flea other than *X. cheopis* concerned in the transmission of human plague in Ecuador. This flea is probably the cause of nearly all cases of plague in the high mountain districts where *cheopis* is not found. *P. irritans* no doubt causes some cases of human plague in Guayaquil and other places where *cheopis* is the chief transmitting flea.

(34) Plague transmitted by *P. irritans* probably does not have as great a mortality rate as that produced by *X. cheopis.*

(35) *P. irritans* is probably the agent involved in the causation of the two unusual types of plague found in Ecuador and called "viruela pestosa" and "angina pestosa."

(36) *P. corporis* and *capitis* may be responsible for some cases of plague, particularly "angina pestosa," which is due to the practice of the natives of killing infected vermin between the teeth.

(37) *X. cheopis* is not found in sufficient number on *Mus musculus* for these animals to be able to transmit plague to any extent and these animals are of very little importance in the causation of plague.

(The concluding part of this article, dealing with antiplague measures in Ecuador, will be published in the following issue of PUBLIC HEALTH REPORTS.)

BIOLOGICAL PRODUCTS

ESTABLISHMENTS LICENSED FOR THE PROPAGATION AND SALE OF VIRUSES, SERUMS, TOXINS, AND ANALOGOUS PRODUCTS

There is presented below a list of the establishments holding licenses issued by the Treasury Department in accordance with the act of Congress approved July 1, 1902, entitled "An act to regulate the sale of viruses, serums, toxins, and analogous products in the District of Columbia, to regulate interstate traffic in said articles, and for other purposes."

The licenses granted to these establishments for the products mentioned do not imply an indorsement of the claims made by the manufacturers for their respective preparations. The granting of a license means that inspection of the establishment concerned and laboratory examinations of samples of its products are made regularly to insure the observance of safe methods of manufacture, to ascertain freedom from contamination, and to determine the potency, or safety, or both, of diphtheria antitoxin, scarlet fever streptococcus antitoxin, tetanus antitoxin, botulinus antitoxin, antidysenteric serum, antimeningococcic serum, antipneumococcic serum, bacterial vaccines made from typhoid bacillus, paratyphoid bacillus A, and paratyphoid bacillus B, diphtheria toxin-antitoxin mixture, diphtheria toxoid, diphtheria toxin for Schick test, scarlet fever streptococcus toxin for Dick test, scarlet fever streptococcus toxin for immunization, and the arsphenamines, the only products for which potency standards or tests have been established.

The enumeration of the products is as follows: Serums are placed first, the antitoxins, being more important, heading the list. The other products are arranged generally in the order of their origin. The items in each class are arranged alphabetically.

Establishments Licensed and Products for which Licenses have been Issued

AMERICAN ESTABLISHMENTS

Parke, Davis & Co., Detroit, Mich.—License No. 1:

Diphtheria antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antidysenteric serum; antigonococcic serum; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; hemostatic serum (Lapenta); normal horse serum; thryroidectomized horse serum; vaccine virus; rabies vaccine (Cumming); tuberculin old; tuberculin T. R.; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from acne bacillus, acne diplococcus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, prodigiosus bacillus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; animal epidermal extract; animal food extract; vegetable food extract; pollen extract; modified bacterial derivatives made from colon bacillus, gonococcus, paratyphoid bacillus A, paratyphoid bacillus B, pneumococcus, staphylococcus albus, staphylococcus aureas, streptococcus, and typhoid bacillus; bacterial antigen made from colon bacillus, gonococcus, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, and streptococcus.

H. K. Mulford Co., Broad and Wallace Streets, Philadelphia, Pa.—License No. 2:

Diphtheria antitoxin; erysipelas streptococcus antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antidysenteric serum; antigonococcic serum; antimelitensis serum; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum, antivenin (Nearctic crotalidae); antivenin Bothropic; antivenin (crotalus terrificus); normal horse serum; vaccine virus; rabies vaccine (Pasteur); rabies vaccine (killed virus); tuberculin old; tuberculin T. R.; tuberculin B. E.; tuberculin B. F.; tuberculin proteose-free (Lyons); bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, dysentery bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, micrococcus melitensis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; sensitized bacteria vaccines made from acne bacillus, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extract; animal epidermal extract; animal food extract; vegetable food extract; poison ivy extract; poison oak extract; pneumococcus antibody solution; bacterial antigen made from streptococci.

The Cutter Laboratory, Berkeley, Calif.—License No. 8:

Diphtheria antitoxin; bacillus oedematiens antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; vibrion septique antitoxin; antistreptococcic serum; normal horse serum; vaccine virus; rabies vaccine (Pasteur); rabies vaccine (killed virus); tuberculin old; tuberculin B. F.; bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; pollen extract; poison ivy extract; poison oak extract.

Bureau of Laboratories, Department of Health, foot East Sixteenth Street, New York City.—License No. 14:

Vaccine virus.

Lederle Laboratories Inc., Pearl River, N. Y.—License No. 17:

Diphtheria antitoxin; erysipelas streptococcus antitoxin; bacillus histolyticus antitoxin; bacillus oedematiens antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antidysenteric serum; antigonococcic serum; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; measles immune serum; normal horse serum; vaccine virus; rabies vaccine (Pasteur); rabies vaccine (killed virus); tuberculin old; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extract; poison ivy extract; poison oak extract.

Bacterio-Therapeutic Laboratory, Asheville, N. C.—License No. 23:

Watery extract of tubercle bacilli (von Ruck); modified tubercle bacillus derivative (von Ruck).

G. H. Sherman, M. D., Inc., 14600 East Jefferson Avenue, Detroit, Mich.—License No. 30:

Bacterial vaccines made from acne bacillus, brucella melitensis, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, nonvirulent tubercle bacillus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; pollen extract.

The Abbott Laboratories, Fourteenth Street and C.-W. Interurban Railroad tracks, North Chicago, Ill.—License No. 43.

Bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigen made from staphylococcus aureus; pollen extract.

St. Louis Pasteur Institute, 3514 Lucas Avenue, St. Louis, Mo.—License No. 50:

Rabies vaccine (killed virus).

The Upjohn Co., Kalamazoo, Mich.—License No. 51:

Bacterial vaccines made from colon bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; pollen extract.

E. R. Squibb & Sons' Research and Biological Laboratories, New Brunswick, N. J.—License No. 52:
Diphtheria antitoxin, erysipelas streptococcus antitoxin, scarlet fever streptococcus antitoxin, tetanus antitoxin; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; normal horse serum; vaccine virus; rabies vaccine (Pasteur); rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, streptococcus, and typhoid bacillus; bacterial antigen made from staphylococcus aureus; leucocytic extract from the horse; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extract; poison ivy extract; poison oak extract; arsphenamine, neoarsphenamine, sulpharsphenamine, solution of arsphenamine.

Eli Lilly & Co., Indianapolis, Ind.—License No. 56:
Diphtheria antitoxin; erysipelas streptococcus antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; antimeningococcic serum; antistreptococcic serum; normal horse serum; vaccine virus; rabies vaccine (Harris); tuberculin old; tuberculin T. R.; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial vaccine made from partially autolized pneumococci; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; ricinoleated antigen made from scarlet fever streptococci.

Swan Myers Co., 219 North Senate Avenue, Indianapolis, Ind.—License No. 58:
Bacterial vaccines made from acne bacillus, brucella melitensis, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, micrococcus tetragenus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigen made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, micrococcus catarrhalis, pneumococcus, staphylococcus albus, staphylococcus aureus and streptococcus; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extract.

Gilliland Laboratories, Marietta, Pa.—License No. 63:
Diphtheria antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; normal horse serum; vaccine virus; rabies vaccine (Pasteur); rabies vaccine (killed virus); tuberculin old; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from acne bacillus, gonococcus, influenza bacillus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization.

Antitoxin and Vaccine Laboratory, Department of Public Health, Commonwealth of Massachusetts, 375 South Street, Jamaica Plain, Boston 30, Mass.—License No. 64:
Diphtheria antitoxin; scarlet fever streptococcus antitoxin; antimeningococcus serum; antipneumococcus serum; vaccine virus; bacterial vaccines made from paratyphoid bacillus A, paratyphoid bacillus B, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxin for Schick test.

United States Standard Products Co., Woodworth, Wis.—License No. 65:
Diphtheria antitoxin; tetanus antitoxin; antimeningococcic serum; normal horse serum; rabies vaccine (killed virus); bacterial vaccines made from paratyphoid bacillus A, paratyphoid bacillus B, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test.

D. L. Harris Laboratories, Metropolitan Building, St. Louis, Mo.—License No. 66:
Rabies vaccine (Harris).

The Arlington Chemical Co., Yonkers, N. Y.—License No. 67:
Bacterial vaccines made from colon bacillus, micrococcus tetragenus, pneumococcus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, streptococcus; pollen extract; animal epidermal extract; animal food extract; vegetable food extract.

Dermatological Research Laboratories, 1720 Lombard Street, Philadelphia, Pa. (branch of Abbott Laboratories, Chicago, Ill.)--License No. 68:
Arsphenamine; neoarsphenamine; sulpharsphenamine; bismuth arsphenamine sulphonate.

H. A. Metz Laboratories, 122 Hudson Street, New York City.—License No. 69.
Arsphenamine; neoarsphenamine; sodium arsphenamine; silver arsphenamine; neosilver arsphenamine; sulpharsphenamine.

Synthetic Drugs and Diarsenol Laboratories, 771 Ellicott Square, Buffalo, N. Y.—License No. 70:
Arsphenamine; neoarsphenamine; sodium arsphenamine; sulpharsphenamine.

Mallinckrodt Chemical Works, St. Louis, Mo.—License No. 77:
Arsphenamine; neoarsphenamine; sulpharsphenamine.

Merck & Co. (Inc.), 916 Parrish Street, Philadelphia, Pa.—License No. 82:
Arsphenamine; neoarsphenamine; sulpharsphenamine; a compound of glucose with arsphenamine base.

Terrell Laboratories, Texas National Bank Building, Fort Worth, Tex.—License No. 84:
Rabies vaccine (killed virus).

Jensen-Salsbery Laboratories, Twenty-first and Penn Streets, Kansas City, Mo.—License No. 85:
Botulinus antitoxin; rabies vaccine (killed virus); bacterial vaccine made from brucella melitensis.

Cook Laboratories, 536 Lake Shore Drive, Chicago, Ill.—License No. 86:
Bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus.

The Neosol Co., 72 Kingsley St., Buffalo, N. Y.—License No. 90:
Solution of neoarsphenamine; solution of sulpharsphenamine.

Hollister Stier Laboratories, Paulson Medical and Dental Bldg., Spokane, Wash.—License No. 91:
Bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, typhoid bacillus, and xerosis bacillus; pollen extract.

DePree Laboratories, Holland, Mich.—License No. 93:
Arsphenamine; neoarsphenamine; sulpharsphenamine

Medical Arts Laboratory, Medical Arts Bldg., Oklahoma City, Okla.—License No. 98:
Rabies vaccine (killed virus).

Bureau of Laboratories, Department of Health, Lansing, Mich.—License No. 99:
Diphtheria antitoxin; scarlet fever streptococcus antitoxin; bacterial vaccine made from paratyphoid bacillus A, paratyphoid bacillus B, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; bacterial antigen made from staphylococcus aureus.

Messrs. G. D. Searle & Co., 4735 Ravenswood Avenue, Chicago, Ill.—License No. 100; Arsphenamine; neoarsphenamine; sulpharsphenamine.

National Drug Co., 5109 Germantown Avenue, Philadelphia, Pa.—License No. 101:
Diphtheria antitoxin; tetanus antitoxin; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; normal horse serum; vaccine virus; rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenze bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; pollen extract.

American Chemical Laboratories, 5109 Germantown Avenue, Philadelphia, Pa.—License No. 102:
Poison ivy extract; poison oak extract.

Balyeat Hay Fever and Asthma Clinic, 1200 North Walker Street, Oklahoma City, Okla.—License No. 103:
Pollen extract; vegetable food extract; animal epidermal extract.

FOREIGN ESTABLISHMENTS

Institut Pasteur de Paris, Paris, France.—License No. 11. Selling agents for the United States: Pasteur Laboratories of America, 366 West Eleventh Street, New York City:
Diphtheria antitoxin; tetanus antitoxin; antianthrax serum; antidysenteric serum; antiplague serum; antistreptococcic serum; bacterial vaccines made from cholera vibrio, plague bacillus, staphylococcus albus and staphylococcus aureus.

Interessen Gesellschaft Farbenindustrie Aktiengesellschaft, Hoechst am Main, Germany.—License No. 24. Selling agents for the United States: H. A. Metz Laboratories, 107 Varick Street, New York City.
Diphtheria antitoxin; tetanus antitoxin; antistreptococcic serum; normal horse serum; tuberculin old; tuberculin T. R.; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from cholera vibrio, gonococcus, staphylococcus albus, staphylococcus aureus, and staphylococcus citreus; typhoid bacillus; sensitized bacterial vaccine made from typhoid bacillus; arsphenamine; neoarsphenamine; sodium arsphenamine; silver arsphenamine; neosilver arsphenamine; sulphoxylarsphenamine.

E. Merck, Darmstadt, Germany.—License No. 31. Selling agents for the United States: Merck & Co. 45-47 Park Place, New York City: Tuberculin Ointment (Moro).

Connaught Antitoxin Laboratory, University of Toronto, Toronto, Canada.—License No. 73:
Diphtheria antitoxin; tetanus antitoxin; diphtheria toxoid.

Les Establissements Poulenc Frères, 92 Rue Vieille-du-Temple, Paris, III, France.—License No. 74. Selling agents for the United States: Geo. J. Wallau, 153 Waverly Place, New York City:
Bacterial vaccines made from gonococcus, micrococcus tetragenus, pertussis bacillus, staphylococcus albus, staphylococcus aureus, and synococcus.

Laboratoire de Biochimie Médicale, 92 Rue Michel-Ange, Paris, France.—License No. 83. Selling agents for the United States: Anglo-French Drug Co., 1270 Broadway, New York City. Selling agents for Porto Rico: Chas. Vere, Box 216, San Juan, P. R.: Sulpharsphenamine.

Istituto Sieroterapico Milanese, via Darwin 20, Milan, Italy.—License No. 87. Selling agents for the United States: Opo-Pharmacal Co., 27 Cleveland Place, New York City:

Antianthrax serum; bacterial vaccines made from gonococcus, pneumococcus, staphylococcus albus, staphylococcus aureus, staphyloccus citreus and streptococcus; neoarsphenamine.

Boots Pure Drug Co., Ltd., Nottingham, England.—License No. 92. Selling agents for the United States: The United Drug Co., 43 Leon Street, Boston, Mass.: Arsphenamine diglucoside.

Etablissements Mouneyrat, Villaneuve-la-Garenne, Seine, France.—License No. 94. Selling agents for the United States: G. J. Wallau, 153 Waverly Place, New York City: Phospharsphenamine.

Institut National de Vaccinotherapie, 26 Rue Pages, Suresnes (Seine), near Paris, France.—License No. 95. Selling agents for the United States: Lee S. Smith Manufacturing Co., Pittsburgh, Pa.:

Bacterial vaccines made from colon bacillus, enterococcus, Friedländer bacillus, micrococcus catarrhalis, micrococcus tetragenus, pneumococcus, staphylococcus albus, staphylococcus aureus and streptococcus.

Behringswerke, A. G., Marburg-am-Lahm, Germany.—License No. 97:

Bacterial vaccines made from colon bacillus, gonococcus, pneumococcus, pyocyaneus bacillus, staphylococcus albus, and staphylococcus aureus, streptococcus.

Laboratorio di Terapia Sperimentale, Corso Torino 26 Rosso, Genoa, Italy.—License No. 38:

Bacterial vaccines made from colon bacillus, enterococcus, gonococcus, pneumococcus, prodigiosus bacillus, pseudodiphtheria bacillus, pseudogonococcus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus and streptococcus.

DEATHS DURING WEEK ENDED AUGUST 16, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended August 16, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Aug. 16, 1930	Corresponding week, 1929
Policies in force	75, 808, 527	74, 586, 141
Number of death claims	13, 653	12, 148
Death claims per 1,000 policies in force, annual rate	9. 4	8. 5

Deaths [1] from all causes in certain large cities of the United States during the week ended August 16, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Aug. 16, 1930				Corresponding week, 1929		Death rate [2] for first 33 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (78 cities)	6, 621	10. 0	679	[4] 53	10. 5	721	12. 4	13. 3
Akron	49	10. 1	6	55	7. 2	6	8. 1	9. 8
Albany [5]	30	12. 2	5	109	14. 9	5	15. 3	16. 8
Atlanta	78	15. 2	15	159	17. 1	7	16. 7	16. 7
White	36		10	317		3		
Colored	42	(6)	5	79	(6)	4	(6)	(6)
Baltimore [5]	184	11. 9	6	20	12. 4	21	14. 6	15. 4
White	139		3	13		13		
Colored	45	(6)	3	49	(6)	8	(6)	(6)
Birmingham	67	13. 5	5	47	13. 9	9	14. 4	17. 0
White	31		4	62		2		
Colored	36	(6)	1	24	(6)	7	(6)	(6)
Boston	168	11. 2	24	68	11. 8	18	14. 6	18. 0

See footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended August 16, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929*—Continued

City	Week ended Aug. 16, 1930				Corresponding week, 1929		Death rate[2] for first 33 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1930	1929
Bridgeport	10	3.5	1	17	10.3	4	11.5	12.9
Buffalo	138	12.5	12	53	11.4	8	13.5	14.6
Cambridge	21	9.6	2	37	9.7	4	12.3	13.3
Camden	18	8.0	2	36	8.0	0	14.3	15.0
Canton	18	8.9	0	0	5.5	1	10.4	11.8
Chicago[4]	493	7.6	52	46	9.6	47	10.8	11.8
Cincinnati	124	14.4	14	83	12.7	7	16.1	17.7
Cleveland	134	7.7	11	33	9.2	14	11.5	13.2
Columbus	59	10.6	10	98	11.3	9	16.5	15.6
Dallas	61	12.1	10		10.5	8	12.1	12.3
White	45		8			8		
Colored	16	(6)	2		(6)	0	(6)	(6)
Dayton	51	13.2	8	118	9.8	7	10.6	11.9
Denver	82	14.8	10	104	13.5	5	14.8	15.3
Des Moines	24	8.8	3	52	11.4	2	12.2	12.1
Detroit	209	6.9	28	43	8.6	42	9.8	11.7
Duluth	14	7.2	1	27	13.4	0	11.4	11.9
El Paso	37	18.8	11		17.1	6	18.2	21.1
Erie	31	13.9	4	85	12.3	2	11.6	13.1
Fall River[5]	15	6.8	0	0	13.6	3	12.7	15.1
Flint	26	8.6	5	58	8.2	7	9.5	11.0
Fort Worth	40	12.9	3		12.1	1	11.6	13.3
White	33		3			0		
Colored	7	(6)	0		(6)	1	(6)	(6)
Grand Rapids	24	7.4	2	30	7.5	4	10.8	10.4
Houston	59	10.5	13		13.2	7	12.6	13.2
White	44		10			5		
Colored	15	(6)	3		(6)	2	(6)	(6)
Indianapolis	82	11.7	5	37	15.0	14	15.1	15.2
White	59		3	26		7		
Colored	23	(6)	2	108	(6)	7	(6)	(6)
Jersey City	52	8.6	6	52	8.6	5	11.8	13.2
Kansas City, Kans	18	7.7	0	0	9.4	2	11.3	14.0
White	11		0	0		2		
Colored	7	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo	96	12.7	12	93	12.6	11	13.9	14.6
Knoxville	22	10.8	6	141	18.6	6	14.4	14.3
White	13		6	156		6		
Colored	9	(6)	0	0	(6)	0	(6)	(6)
Los Angeles	269	11.3	25	76	9.9	16	11.4	11.8
Louisville	94	15.9	6	52	12.2	10	14.1	15.6
White	72		5	49		10		
Colored	22	(6)	1	72	(6)	0	(6)	(6)
Lowell[7]	19	9.9	1	24	9.3	1	14.1	15.1
Lynn	13	6.6	3	76	7.2	1	11.1	11.9
Memphis	68	14.0	9	107	13.0	11	18.1	19.6
White	25		4	74		9		
Colored	43	(6)	5	169	(6)	2	(6)	(6)
Milwaukee	82	7.5	7	35	7.2	8	10.1	11.6
Minneapolis	77	8.6	6	39	8.8	6	10.9	11.4
Nashville	60	21.3	8	124	17.8	9	18.0	19.8
White	35		7	144		5		
Colored	25	(6)	1	63	(6)	4	(6)	(6)
New Bedford[7]	18	8.3	2	51	8.3	1	11.5	13.4
New Haven	30	9.6	1	19	9.6	3	13.5	13.8
New Orleans	137	15.6	18	104	15.2	14	18.1	18.3
White	94		10	88		12		
Colored	43	(6)	8	135	(6)	2	(6)	(6)
New York	1,131	8.4	106	45	8.8	113	11.3	12.0
Bronx Borough	160	6.5	15	35	6.3	9	8.2	8.7
Brooklyn Borough	379	7.6	40	43	7.4	38	10.2	10.8
Manhattan Borough	443	12.5	40	66	12.6	50	17.0	17.4
Queens Borough	110	5.2	9	26	7.4	16	7.3	8.0
Richmond Borough	39	12.9	2	37	15.5	0	14.9	16.4
Newark, N. J	75	8.8	12	63	9.8	10	12.6	13.5
Oakland	48	8.8	1	12	10.6	8	11.2	11.7
Oklahoma City	49	13.8	7	137	12.4	5	10.9	11.2
Omaha	48	11.7	5	57	13.2	4	14.3	14.3
Paterson	28	10.6	2	35	9.8	2	12.7	14.1
Philadelphia	432	11.5	50	74	11.3	56	13.0	13.8
Pittsburgh	131	10.2	16	59	10.8	18	14.3	15.5

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended August 16, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929)—Continued.

City	Week ended Aug. 16, 1930				Corresponding week, 1929		Death rate [2] for first 33 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Portland, Oreg	55	9.6	3	37	10.9	5	12.7	13.2
Providence	49	10.2	3	28	10.4	2	13.8	15.4
Richmond	48	13.7	1	15	12.6	7	15.5	17.2
White	21		1	22		3		
Colored	27	(6)	0	0	(6)	4	(6)	(6)
Rochester	62	9.9	7	62	12.1	10	12.0	13.1
St. Louis	225	14.3	17	55	10.6	18	14.9	15.4
St. Paul	33	6.3	4	41	8.6	2	10.4	11.0
Salt Lake City [5]	21	7.8	3	47	12.1	1	12.9	13.6
San Antonio	56	11.4	11		16.2	9	16.0	15.4
San Diego	35	12.2	2	42	9.8	1	14.6	15.9
San Francisco	130	10.8	6	41	12.2	7	13.4	13.6
Schenectady	16	8.7	1	31	12.0	7	11.5	13.0
Seattle	71	10.2	4	40	10.4	6	11.2	11.4
Somerville	11	5.5	1	33	4.1	1	10.2	9.6
Spokane	29	13.1	2	52	11.3	1	12.6	13.4
Springfield, Mass	27	9.4	1	16	14.1	2	12.6	13.3
Syracuse	33	8.3	6	74	10.9	7	12.2	13.7
Tacoma	25	12.2	1	26	8.8	1	12.9	12.1
Toledo	49	8.8	4	37	10.7	5	13.0	14.1
Trenton	42	17.8	1	19	13.6	7	17.4	17.9
Utica	9	4.6	0	0	13.8	3	15.4	16.2
Washington, D. C	130	13.9	18	104	13.0	16	15.7	16.1
White	70		9	78		6		
Colored	60	(6)	9	160	(6)	10	(6)	(6)
Waterbury	17	8.7	1	26	6.8	1	10.2	10.0
Wilmington, Del. [7]	32	15.9	2	45	11.4	1	15.0	14.5
Worcester	29	7.7	1	13	9.9	5	13.3	13.2
Yonkers	18	6.9	0	0	11.4	3	8.3	9.5
Youngstown	26	7.9	2	31	11.9	5	10.5	12.6

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population April 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended August 23, 1930, and August 24, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 23, 1930, and August 24, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 23, 1930	Week ended Aug. 24, 1929	Week ended Aug. 23, 1930	Week ended Aug. 24, 1929	Week ended Aug. 23, 1930	Week ended Aug. 24, 1929	Week ended Aug. 23, 1930	Week ended Aug. 24, 1929
New England States:								
Maine	3				6	7	0	1
New Hampshire	2	4	8				0	0
Vermont	2	1			5	1	0	0
Massachusetts	44	45	2	1	44	21	5	2
Rhode Island	1	5					0	0
Connecticut	10	9			6	17	1	0
Middle Atlantic States:								
New York	51	101	[1] 4	[1] 5	70	58	9	8
New Jersey	38	53	1	3	35	15	4	6
Pennsylvania	37	53			91	61	12	6
East North Central States:								
Ohio	7	26	4		12	15	1	5
Indiana	11	11	6		5	3	10	1
Illinois	56	80	4	4	17	51	6	4
Michigan	17	38			37	46	2	23
Wisconsin	11	19	3	11	45	39	2	4
West North Central States:								
Minnesota	6	15	1		2	3	2	1
Iowa	1	1				14	1	2
Missouri	12	10	1		10	6	3	8
North Dakota	1	6				8	1	0
South Dakota	4	2			3	2	0	0
Nebraska	2	1			1	7	0	0
Kansas	9	10			4	15	5	0
South Atlantic States:								
Delaware	3	1			6		0	0
Maryland [2]	9	16	1	5	4	1	1	1
District of Columbia	3	9			8		1	1
Virginia								
West Virginia	9	10	4		11	11	0	2
North Carolina	77	101	2		2		0	1
South Carolina	11	50	86	132	1		0	0
Georgia	5	19	9	25	4	1	2	0
Florida	1	6	2		1	2	0	0
East South Central States:								
Kentucky							1	0
Tennessee	10	16	2	11	3	6	3	0
Alabama	12	41	3	2	6	9	4	1
Mississippi	10	25					5	
West South Central States:								
Arkansas	3	5	2	3		1	0	0
Louisiana	14	17	3	6			1	0
Oklahoma [3]	4	22	4	8	3	7	0	1
Texas	16	33		2	15	8	2	0
Mountain States:								
Montana	2	5			1	34	0	0
Idaho					1	3	1	0
Wyoming		1				2	0	0
Colorado	5	6			4	10	0	1
New Mexico	5	3					2	1
Arizona	5				2		0	1
Utah [2]			3	5	1		0	1

[1] New York City only.
[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 23, 1930, and August 24, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 23, 1930	Week ended Aug. 24, 1929	Week ended Aug. 23, 1930	Week ended Aug. 24, 1929	Week ended Aug. 23, 1930	Week ended Aug. 24, 1929	Week ended Aug. 23, 1930	Week ended Aug. 24, 1929
Pacific States:								
Washington	3	3			21	24	0	4
Oregon	6	2	6	2	13	9	2	0
California	36	38	13	9	59	23	5	8

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 23, 1930	Week ended Aug. 24, 1929	Week ended Aug. 23, 1930	Week ended Aug. 24, 1929	Week ended Aug. 23, 1930	Week ended Aug. 24, 1929	Week ended Aug. 23, 1930	Week ended Aug. 24, 1929
New England States:								
Maine	2	0	12	21	0	0	3	0
New Hampshire	1	0	0	0	0	0	0	2
Vermont	0	0	1	0	0	0	0	0
Massachusetts	27	6	42	44	0	0	23	16
Rhode Island	1	0	2	1	0	0	0	0
Connecticut	2	2	4	7	0	0	2	5
Middle Atlantic States:								
New York	72	30	61	51	0	6	30	70
New Jersey	5	1	17	16	0	0	12	18
Pennsylvania	8	6	48	66	0	0	46	19
East North Central States:								
Ohio	13	5	40	28	8	19	47	30
Indiana	3	0	16	21	15	5	9	12
Illinois	8	3	57	89	17	9	44	35
Michigan	5	5	28	71	8	29	20	7
Wisconsin	3	0	26	33	9	7	6	6
West North Central States:								
Minnesota	12	0	7	30	3	6	7	5
Iowa	6	1	11	15	15	1	1	22
Missouri	8	0	10	17	7	4	28	20
North Dakota	2	0	3	1	1	1	2	1
South Dakota	5	0	2	5	0	2	2	2
Nebraska	4	0	4	5	2	1	3	3
Kansas	30	1	14	16	7	4	17	11
South Atlantic States:								
Delaware	0	0	1	0	0	0	6	1
Maryland [1]	1	0	5	14	0	0	70	21
District of Columbia	1	0	4	2	0	0	2	4
Virginia		8						
West Virginia	0	3	8	15	2	1	39	25
North Carolina	4	2	34	41	5	1	52	50
South Carolina	0	3	3	8	0	2	65	53
Georgia	0	1	12	15	0	0	39	42
Florida	0	2	1	0	0	0	4	1
East South Central States:								
Kentucky	0	0	8	29	9	1	73	23
Tennessee	0	10	10	11	0	0	97	77
Alabama	1	0	16	24	1	0	41	28
Mississippi	1	1	5	8	2	0	31	31
West South Central States:								
Arkansas	7	0	9	8	6	0	28	23
Louisiana	10	0	8	7	0	0	22	26
Oklahoma [2]	10	1	4	18	4	1	54	63
Texas	4	1	10	8	3	17	32	40
Mountain States:								
Montana	0	0	6	5	1	7	2	7
Idaho	0	0	0	4	1	7	2	1
Wyoming	3	0	7	1	0	0	2	3
Colorado	1	0	6	5	1	2	8	6
New Mexico	1	0	3	1	0	2	4	25
Arizona	2	0	0	1	1	0	4	3
Utah [1]	0	0	4	2	0	2	1	3
Pacific States:								
Washington	0	0	3	5	7	12	3	7
Oregon	0	0	7	7	5	6	1	5
California	62	11	34	69	9	22	19	17

[1] Week ended Friday.
[2] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July, 1930										
Alabama	2	24	9	738	133	85	6	39	2	133
California	16	211	83	17	1,995	10	450	209	100	117
Idaho	6	1			21		1	1	10	2
Louisiana	6	39	11	143	11	50	98	33	24	154
Minnesota	3	53	1		239		58	116	14	20
Nevada									1	
North Carolina	5	95	31		118	1,094	22	112	29	268
Oklahoma [1]	3	18	19	394	36	57	41	34	116	167
Pennsylvania	20	331		5	2,053	2	9	529	1	99
Rhode Island	1	10			47		1	24	0	2
South Dakota	5	13	4	2	84		6	15	70	5
Washington	8	26	21		507	1	5	66	126	15
West Virginia	1	17	36		92		2	63	29	96

July, 1930

	Cases
Actinomycosis:	
California	1
Anthrax:	
Louisiana	1
Chicken pox:	
Alabama	25
California	376
Idaho	20
Louisiana	1
Minnesota	136
Nevada	5
North Carolina	77
Oklahoma [1]	13
Pennsylvania	542
Rhode Island	16
South Dakota	36
Washington	98
West Virginia	25
Conjunctivitis:	
Oklahoma [1]	1
Rhode Island	1
Dysentery:	
California (amebic)	4
California (bacillary)	21
Minnesota	1
Minnesota (amebic)	14
Oklahoma [1]	80
Pennsylvania	3
Washington	1
Food poisoning:	
California	67
German measles:	
California	31
North Carolina	42
Pennsylvania	183
Rhode Island	13
Washington	37
Granuloma, coccidioidal:	
California	4

[1] Exclusive of Oklahoma City and Tulsa.

	Cases
Hookworm disease:	
California	1
Louisiana	18
Oklahoma [1]	1
Impetigo contagiosa:	
Washington	2
Jaundice:	
California	2
Leprosy:	
California	2
Louisiana	1
Lethargic encephalitis:	
Alabama	4
California	1
Minnesota	2
Pennsylvania	12
Washington	4
Mumps:	
Alabama	18
California	696
Idaho	14
Louisiana	1
Pennsylvania	461
Rhode Island	9
South Dakota	2
Washington	146
Ophthalmia neonatorum:	
California	1
North Carolina	3
Oklahoma [1]	1
Pennsylvania	12
Rhode Island	1
South Dakota	1
Paratyphoid fever:	
California	6
North Carolina	3
Washington	1
Puerperal septicemia:	
Louisiana	1
Pennsylvania	17
Washington	8

	Cases
Rabies in animals:	
California	69
Louisiana	6
Rhode Island	5
Rabies in man:	
Alabama	1
Pennsylvania	1
South Dakota	1
Rocky Mountain spotted or tick fever:	
California	1
Idaho	8
Nevada	2
Septic sore throat:	
Louisiana	1
North Carolina	5
Oklahoma [1]	20
Washington	1
Tetanus:	
California	6
Pennsylvania	15
Trachoma:	
California	9
Oklahoma [1]	7
South Dakota	1
Trichinosis:	
California	3
Pennsylvania	11

	Cases
Tularaemia:	
California	1
Idaho	1
Louisiana	1
Typhus fever:	
Alabama	3
North Carolina	4
Undulant fever:	
California	10
Louisiana	2
Minnesota	5
Pennsylvania	4
Washington	6
Vincent's angina:	
Oklahoma [1]	1
Whooping cough:	
Alabama	94
California	683
Idaho	72
Louisiana	39
Minnesota	112
North Carolina	900
Oklahoma [1]	47
Pennsylvania	1,014
Rhode Island	55
South Dakota	11
Washington	234
West Virginia	174

[1] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,720,000. The estimated population of the 89 cities reporting deaths is more than 30,330,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended August 16, 1930, and August 17, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	573	824	
95 cities	191	372	424
Measles:			
45 States	738	717	
95 cities	198	145	
Meningococcus meningitis:			
46 States	101	102	
95 cities	51	59	
Poliomyelitis:			
46 States	303	114	
Scarlet fever:			
46 States	642	796	
95 cities	188	237	241
Smallpox:			
46 States	214	225	
95 cities	16	41	10
Typhoid fever:			
46 States	1,045	822	
95 cities	129	118	172
Deaths reported			
Influenza and pneumonia:			
89 cities	322	341	
Smallpox:			
89 cities	0	0	

City reports for week ended August 16, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	1	1	0		0	0	3	1
New Hampshire:								
Concord	0	0	0		0	0	0	0
Manchester	0	0	0		0	0	0	1
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	0	0		0	1	0	0
Massachusetts:								
Boston	4	18	11		0	14	4	10
Fall River	1	1	1		0	2	1	2
Springfield	2	1	2		0	1	0	0
Worcester	0	3	2		0	2	0	0
Rhode Island:								
Pawtucket	0	0	0		0	0	0	1
Providence	2	3	0		0	1	0	1
Connecticut:								
Bridgeport		2						
Hartford	0	2	1		0	7	2	1
New Haven	0	1	0		0	0	0	0
MIDDLE ATLANTIC								
New York:								
Buffalo	5	8	7		1	9	6	10
New York	8	86	24		2	39	17	92
Rochester	0	2	1		0	0	0	1
Syracuse		2			0			1
New Jersey:								
Camden	0	2	0		0	8	0	0
Newark	0	6	6		0	1	3	3
Trenton	0	1	0		0	0	1	2
Pennsylvania:								
Philadelphia	9	28	6		0	16	16	25
Pittsburgh	2	11	3		2	9	4	13
Reading	0	0	1		0	0	1	3
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	0	3	2		0	0	0	5
Cleveland	3	19	1	3	0	3	4	3
Columbus	0	2	0		0	1	1	1
Toledo	1	5	0		1	3	0	1
Indiana:								
Fort Wayne	0	1	0		0	0	0	1
Indianapolis	0	2	0		0	0	3	4
South Bend	0	0	1		0	0	0	0
Terre Haute	0	1	0		0	1	0	1
Illinois:								
Chicago	7	54	40	3	0	8	14	13
Springfield	0	0	0		0	0	0	1
Michigan:								
Detroit	9	24	13		0	7	2	9
Flint	0	2	0		0	5	0	1
Grand Rapids	0	1	0		0	1	1	2

City reports for week ended August 16, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	0	1	0		0	1	3	0
Madison	0	1	2			0	0	
Milwaukee	13	6	1		0	3	12	2
Racine	2	0	0		0	0	0	1
Superior	0	1	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0		0	0	1	0
Minneapolis	1	10	6		1	2	1	3
St. Paul	2	4	0		0	0	0	0
Iowa:								
Davenport	0	1	0			0	0	
Des Moines	0	1	0			0	0	
Sioux City	0	1	0			0	0	
Waterloo	0	0	2			0	0	
Missouri:								
Kansas City	0	1	0		0	2	0	4
St. Joseph	0	0	0		0	0	0	0
St. Louis	1	15	3			5	6	
North Dakota:								
Fargo	0	1	0		0	0	10	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	0	0	0			1	0	
Nebraska:								
Omaha	1	2	2		0	0	0	2
Kansas:								
Topeka	1	1	0		0	0	1	0
Wichita	0	0	1		0	7	0	0
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	0	0		0	0	0	0
Maryland:								
Baltimore	1	12	7	2	0	1	0	12
Cumberland	0	0	0		0	0	0	0
Frederick	0	0	0		0	0	0	0
District of Columbia:								
Washington	2	6	1		0	6	0	8
Virginia:								
Lynchburg	0	1	0		0	0	1	0
Norfolk	0	1	3		0	0	0	1
Richmond	0	5	3		0	3	0	1
Roanoke	0	1	3		0	1	0	0
West Virginia:								
Charleston	0	0	0		0	0	0	1
Wheeling	0	0	0		0	0	0	2
North Carolina:								
Raleigh	0	0	1		0	0	0	0
Wilmington	1	0	1		0	0	0	1
Winston-Salem	0	1	0		0	0	0	1
South Carolina:								
Charleston	0	0	0	3	0	0	0	3
Columbia		1						
Georgia:								
Atlanta	1	2	1	1	0	0	0	3
Brunswick	0	0	0		0	0	0	0
Savannah	0	0	1	1	0	1	1	1
Florida:								
Miami	0	1	0		0	0	0	2
St. Petersburg	0	0	0		0	0	0	0
Tampa	0	1	0		0	0	0	2
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	1		0	0	0	0
Tennessee:								
Memphis	0	2	1		0	0	0	1
Nashville	1	2	0		0	1	0	4
Alabama:								
Birmingham	0	3	2		0	2	0	2
Mobile	0	0	1		0	0	0	1
Montgomery	0	0	0			0	0	

City reports for week ended August 16, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST SOUTH CENTRAL								
Arkansas:								
Forth Smith	0	1	1			0	0	
Little Rock	0	0	0		0	0	0	0
Louisiana:								
New Orleans	0	5	4		0	1	0	12
Shreveport	0	1	0		0	0	0	0
Oklahoma:								
Oklahoma City	0	1	0		0	0	0	
Tulsa	0	1	1			0	0	
Texas:								
Dallas	0	4	2		0	1	0	5
Forth Worth	0	2	0		0	0	0	2
Galveston	0	0	0		0	0	0	2
Houston	0	2	2		0	0	0	3
San Antonio	0	2	5		0	0	1	2
MOUNTAIN								
Montana:								
Billings	0	0	0		0	0	0	2
Great Falls	0	0	0		0	1	0	0
Helena	0	0	0		0	0	0	1
Missoula	0	0	0		0	1	0	1
Idaho:								
Boise	0	1	0		0	0	0	0
Colorado:								
Denver	3	6	2		0	1	5	8
Pueblo	0	1	0		0	2	4	1
New Mexico:								
Albuquerque	0	0	0		0	0	0	0
Utah:								
Salt Lake City	5	2	0		0	0	3	1
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	1	2	0			10	11	
Spokane	0	2	0			1	0	
Tacoma	0	1	2		0	2	0	0
Oregon:								
Portland	1	4	0		0	9	5	2
Salem	0	0	0		0	0	0	0
California:								
Los Angeles	3	22	13		0	6	10	13
Sacramento	1	2	0		0	1	5	2
San Francisco	2	9	0		0	1	1	1

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	0	0	0	0	0	0	1	0	0	6	13
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	6
Manchester	1	0	0	0	0	0	0	0	0	0	22
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	3
Burlington	1	0	0	0	0	0	0	0	0	0	6
Massachusetts:											
Boston	15	13	0	0	0	11	3	1	0	43	168
Fall River	1	0	0	0	0	0	1	0	0	3	15
Springfield	1	0	0	0	0	1	0	1	0	2	26
Worcester	2	5	0	0	0	7	0	0	0	5	29

City reports for week ended August 16, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND—continued											
Rhode Island:											
Pawtucket	0	0	0	0	0	1	0	0	0	0	12
Providence	2	3	0	0	0	4	1	0	1	4	49
Connecticut:											
Bridgeport	2		0				0				
Hartford	1	0	0	0	0	1	1	0	0	3	25
New Haven	1	0	0	0	0	1	1	0	0	5	30
MIDDLE ATLANTIC											
New York:											
Buffalo	5	2	0	0	0	12	1	0	0	43	128
New York	25	11	0	0	0	75	35	17	0	94	1,131
Rochester	2	0	0	0	0	0	1	0	0	1	56
Syracuse	1		0		0	1	0		0		33
New Jersey:											
Camden	0	0	1	0	0	2	0	0	0	0	18
Newark	4	5	0	0	0	9	1	2	0	19	72
Trenton	0	1	0	0	0	8	1	0	0	4	42
Pennsylvania:											
Philadelphia	15	12	0	0	0	24	8	7	1	36	432
Pittsburgh	6	3	0	0	0	10	3	5	2	14	131
Reading	0	0	0	0	0	1	0	0	0	4	19
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	3	0	0	0	8	2	0	0	1	124
Cleveland	9	9	0	0	0	10	4	2	0	27	134
Columbus	2	2	0	0	0	2	0	0	0	1	59
Toledo	2	0	0	1	0	3	2	6	0	8	49
Indiana:											
Fort Wayne	0	0	0	0	0	0	0	0	0	0	31
Indianapolis	2	0	1	1	0	6	1	0	1	13	
South Bend	1	1	0	0	0	2	0	0	0	0	12
Terre Haute	0	0	0	0	0	0	0	0	0	0	13
Illinois:											
Chicago	24	21	0	1	0	25	6	7	1	63	493
Springfield	0	0	0	0	0	1	2	1	0	1	22
Michigan:											
Detroit	22	12	1	3	0	14	5	6	0	107	209
Flint	4	1	1	0	0	0	1	0	0	11	26
Grand Rapids	3	1	0	0	0	1	0	0	0	5	24
Wisconsin:											
Kenosha	0	2	0	0	0	0	0	0	0	2	4
Madison	0	2	0	0			0	0		1	
Milwaukee	6	3	0	0	0	5	0	0	0	48	82
Racine	1	5	0	0	0	1	0	0	0	4	14
Superior	1	3	0	0	0	0	0	0	0	0	7
WEST NORTH CENTRAL											
Minnesota:											
Duluth	3	1	0	0	0	1	1	0	0	3	14
Minneapolis	12	3	1	0	0	2	1	0	0	8	77
St. Paul	6	0	0	0	0	0	1	0	0	9	42
Iowa:											
Davenport	0	1	1	3			0	0		0	
Des Moines	2	0	0	0			0	1		0	
Sioux City	0	1	1	0			0	0		1	
Waterloo	0	0	0	0			0	0		2	
Missouri:											
Kansas City	2	*2	0	0	0	6	3	3	0	2	96
St. Joseph	0	0	0	0	0	0	1	0	0	0	11
St. Louis	8	5	0	1	0	8	7	9	1	7	225
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	0	5
Grand Forks	2	0	0	0			0	0		0	
South Dakota:											
Aberdeen	0	0	0	0			0	4		1	
Nebraska:											
Omaha	1	1	0	2	0	1	0	1	0	1	48
Kansas:											
Topeka	2	1	0	0	0	1	0	0	0	5	5
Wichita	1	1	0	0	0	0	1	2	0	5	29

City reports for week ended August 16, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	2	0	0	0	0	0	0	0	1	32
Maryland:											
Baltimore	5	1	0	0	0	10	9	7	1	23	184
Cumberland	0	0	0	0	0	0	1	1	1	0	12
Frederick	0	0	0	0	0	0	0	0	0	0	1
District of Col.:											
Washington	4	4	0	0	0	13	4	2	3	9	130
Virginia:											
Lynchburg	0	0	0	0	0	0	1	1	0	1	11
Norfolk	1	2	1	0	0	2	1	5	0	0	-
Richmond	2	2	0	0	0	3	2	1	0	0	33
Roanoke	1	0	0	0	0	1	1	1	0	3	11
West Virginia:											
Charleston	1	0	0	0	0	0	1	4[1]	1	3	21
Wheeling	0	1	0	0	0	1	0	0	0	3	17
North Carolina:											
Raleigh	0	0	0	0	0	2	0	0	0	2	8
Wilmington	0	1	0	0	0	0	1	0	0	6	12
Winston-Salem	0	2	1	0	0	2	2	1	0	0	16
South Carolina:											
Charleston	0	0	0	0	0	2	2	0	0	0	18
Columbia	1	-	0	-	-	-	1	-	-	-	-
Georgia:											
Atlanta	3	1	0	0	0	3	4	1	2	0	78
Brunswick	0	0	0	0	0	0	0	0	0	0	3
Savannah	0	0	0	0	0	2	0	1	0	0	25
Florida:											
Miami	0	1	0	0	0	1	0	1	0	2	19
St. Petersburg	0	-	0	-	0	0	0	-	0	-	6
Tampa	0	0	0	0	0	0	0	2	0	0	26
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	1	1	0	0	2	0	0	1	0	20
Tennessee:											
Memphis	1	4	0	1	0	4	7	13	0	20	68
Nashville	0	0	0	0	0	2	6	5	0	4	60
Alabama:											
Birmingham	2	3	0	0	0	3	6	4	1	4	67
Mobile	0	0	0	0	0	0	0	0	1	0	25
Montgomery	1	0	0	0	-	-	1	0	-	0	-
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	-	-	0	0	-	0	-
Little Rock	0	1	0	0	0	1	2	1	0	0	-
Louisiana:											
New Orleans	2	2	0	0	0	15	5	5	0	4	137
Shreveport	0	0	0	0	0	1	2	0	1	0	28
Oklahoma:											
Oklahoma City	1	1	0	0	0	2	2	4	1	0	49
Tulsa	0	0	0	0	-	-	2	1	-	0	-
Texas:											
Dallas	2	3	0	0	0	3	3	4	2	2	61
Fort Worth	1	0	1	0	0	3	3	0	0	0	40
Galveston	0	0	0	0	0	0	0	0	0	0	11
Houston	1	1	0	1	0	3	0	2	1	0	59
San Antonio	0	2	0	0	0	5	1	0	1	0	56
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	7
Great Falls	0	2	0	0	0	0	0	0	0	1	8
Helena	0	0	0	0	0	0	0	1	0	3	5
Missoula	0	0	0	0	0	0	1	0	0	0	8
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	1	2

[1] Includes 3 nonresidents.

City reports for week ended August 16, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
MOUNTAIN—con.											
Colorado:											
Denver	2	2	0	0	0	7	2	0	1	20	79
Pueblo	0	0	0	0	0	1	1	0	0	2	6
New Mexico:											
Albuquerque	0	0	0	0	0	1	1	0	0	0	8
Utah:											
Salt Lake City	1	1	0	0	0	2	2	2	0	29	21
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	2	4	0	0			2	1		29	
Spokane	2	0	0	3			1	0		0	
Tacoma	1	1	1	1	0	0	1	0	0	4	
Oregon:											
Portland	1	0	4	0	0	1	1	0	0	0	55
Salem	0	0	0	0	0	0	0	0	0	2	
California:											
Los Angeles	7	6	1	1	0	25	3	4	0	20	269
Sacramento	1	0	0	1	0	1	1	0	0	0	18
San Francisco	5	5	0	0	0	4	3	1	0	2	160

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	1	2
Massachusetts:									
Boston	2	0	0	0	0	0	2	13	3
Worcester	0	0	0	0	0	0	0	1	0
Rhode Island:									
Providence	0	0	0	0	0	0	1	1	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	0	0	0	0	1	8	2
New York	13	5	0	2	0	1	16	2	0
Rochester	0	0	0	0	0	0	0	1	0
Syracuse	0	0	0	0	0	0	2	0	3
New Jersey:									
Newark	4	0	0	0	0	0	1	0	0
Pennsylvania:									
Philadelphia	10	2	0	0	0	0	1	9	1
Pittsburgh	2	0	0	0	0	0	1	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	2	0	0	0	0	0	1	0	0
Cleveland	0	0	0	0	0	0	1	1	0
Illinois:									
Chicago	5	3	0	0	0	0	2	11	2
Michigan:									
Detroit	2	0	0	0	0	0	2	3	1
Wisconsin:									
Kenosha	0	0	0	0	0	0	1	1	0

City reports for week ended August 16, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST NORTH CENTRAL									
Minnesota:									
Duluth	1	0	0	0	0	0	0	0	0
Minneapolis	1	0	0	0	0	0	0	2	0
Missouri:									
Kansas City	2	0	0	0	0	0	0	0	0
St. Louis	0	0	1	0	0	0	0	1	0
North Dakota:									
Fargo	0	0	1	0	0	0	0	0	0
Kansas:									
Wichita	0	0	0	0	0	0	0	4	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	0	1	0	0	1	0	0
Virginia:									
Norfolk	0	0	0	0	0	0	0	8	1
South Carolina:									
Charleston	0	0	0	0	1	0	0	0	0
Georgia: [1]									
Atlanta	0	0	0	0	2	2	0	0	0
Florida:									
Tampa [1]	0	0	0	1	0	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	1	0	0	0	0	1	0	0
Nashville	0	2	0	0	0	0	0	0	0
Alabama:									
Birmingham	2	0	0	0	1	1	0	0	0
Mobile	0	0	0	0	0	2	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	5	1	0	0	0
Shreveport [1]	0	0	0	0	0	0	0	1	0
Texas:									
Dallas	0	0	0	0	0	3	0	0	0
Fort Worth	0	0	0	0	0	1	0	0	0
Houston	0	0	0	0	0	0	0	1	0
San Antonio	0	0	0	0	0	0	0	1	0
MOUNTAIN									
Colorado:									
Denver	0	0	0	0	0	0	0	3	0
New Mexico:									
Albuquerque	0	0	0	0	0	0	0	1	1
Utah:									
Salt Lake City	2	0	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	1	1	0
Tacoma	1	1	0	0	0	0	0	0	0
California:									
Los Angeles	1	0	0	0	0	0	1	18	0
San Francisco	0	0	1	0	1	0	1	1	0

[1] Typhus fever, 13 cases and 1 death: 8 cases at Savannah, Ga., and 5 cases at Tampa, Fla., and 1 death at Shreveport, La.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended August 16, 1930, compared with those for a like period ended August 17, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, July 13 to August 16, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929
98 cities	49	73	38	68	39	67	[2] 38	[3] 63	[4] 31	61
New England	33	83	22	58	33	54	31	45	[5] 41	38
Middle Atlantic	48	76	35	75	35	67	[6] 35	70	[7] 23	59
East North Central	66	105	49	103	49	99	48	81	36	86
West North Central	38	54	34	21	34	25	[8] 30	31	27	23
South Atlantic	42	30	35	28	37	47	16	30	[9] 34	47
East South Central	13	27	27	27	7	34	[10] 27	[3] 30	34	82
West South Central	37	69	34	99	37	95	[11] 51	118	52	122
Mountain	69	17	69	9	34	9	17	35	17	44
Pacific	38	41	33	31	52	46	66	43	35	32

MEASLES CASE RATES

	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929
98 cities	151	98	107	69	68	49	[2] 51	[3] 30	[4] 33	21
New England	235	146	175	101	97	97	91	31	[5] 65	29
Middle Atlantic	205	47	152	27	91	35	[6] 67	15	[7] 40	15
East North Central	71	210	60	149	34	84	28	58	19	35
West North Central	57	52	63	58	42	38	[8] 47	33	30	13
South Atlantic	112	43	46	17	55	11	22	9	[9] 22	15
East South Central	47	7	61	7	40	7	[10] 27	[3] 7	20	0
West South Central	11	4	7	27	11	8	[11] 14	19	7	23
Mountain	240	61	172	70	154	26	112	61	43	52
Pacific	361	109	191	77	118	43	73	24	50	46

SCARLET FEVER CASE RATES

	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929
98 cities	54	64	50	59	39	40	[2] 32	[3] 44	[4] 31	39
New England	60	56	66	56	55	63	42	52	[5] 51	49
Middle Atlantic	37	35	36	19	22	24	[6] 19	23	[7] 17	17
East North Central	87	103	76	110	50	62	46	72	39	50
West North Central	42	54	30	77	49	35	[8] 28	44	28	40
South Atlantic	44	69	37	60	40	28	18	41	[9] 26	73
East South Central	20	55	54	27	7	34	[10] 18	[3] 15	54	14
West South Central	22	72	49	57	56	38	[11] 45	42	34	38
Mountain	77	78	26	26	60	9	69	44	43	78
Pacific	57	65	45	65	40	48	45	56	38	53

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1930 and 1929, respectively.
[2] Rochester, N. Y., Wichita, Kans., Memphis, Tenn., and Houston, Tex., not included.
[3] Montgomery, Ala., not included.
[4] Bridgeport, Conn., Syracuse, N. Y., and Columbia, S. C., not included.
[5] Bridgeport, Conn., not included.
[6] Rochester, N. Y., not included.
[7] Syracuse, N. Y., not included.
[8] Wichita, Kans., not included.
[9] Columbia, S. C., not included.
[10] Memphis, Tenn., not included.
[11] Houston, Tex., not included.

Summary of weekly reports from cities, July 13 to August 16, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929— Continued

SMALLPOX CASE RATES

	Week ended—									
	July 19, 1930	July 20, 1929	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929
98 cities	6	13	7	8	4	7	[2] 2	[3] 5	[4] 3	7
New England	0	0	0	0	0	0	0	0	[5] 0	0
Middle Atlantic	0	0	0	0	0	0	[6] 0	0	[7] 0	3
East North Central	10	32	8	16	2	13	6	12	3	16
West North Central	13	21	21	21	13	6	[8] 4	10	6	4
South Atlantic	4	2	2	0	4	0	2	0	[9] 0	0
East South Atlantic	0	7	20	7	0	7	[10] 0	[3] 7	7	7
West South Central	7	0	4	8	15	4	[11] 5	0	4	0
Mountain	17	44	17	9	0	26	0	0	0	9
Pacific	21	34	26	22	26	34	5	17	14	12

TYPHOID FEVER CASE RATES

98 cities	16	18	18	18	18	19	[2] 17	[3] 17	[4] 21	20
New England	9	9	7	29	7	11	4	13	[5] 5	11
Middle Atlantic	4	10	7	7	5	11	[6] 10	11	[7] 15	19
East North Central	9	8	13	8	13	10	11	11	10	5
West North Central	23	19	47	13	23	33	[8] 20	15	28	6
South Atlantic	40	32	38	37	48	22	60	22	[9] 41	39
East South Central	67	144	74	103	121	150	[10] 54	[3] 45	148	123
West South Central	64	57	41	69	45	53	[11] 5	61	45	46
Mountain	26	52	17	44	26	9	34	9	26	61
Pacific	19	5	12	7	19	19	12	29	14	17

INFLUENZA DEATH RATES

91 cities	3	3	3	3	1	3	[2] 3	1	[12] 1	3
New England	0	0	0	2	0	0	0	0	[5] 0	0
Middle Atlantic	3	2	1	2	0	2	[6] 2	1	2	2
East North Central	2	3	3	4	1	4	1	1	0	2
West North Central	0	3	3	3	0	0	[8] 3	6	3	3
South Atlantic	0	6	4	4	5	4	9	0	[9] 0	0
East South Central	0	0	0	0	0	15	[10] 0	0	0	22
West South Central	11	20	11	4	0	8	[11] 0	0	0	12
Mountain	9	0	0	9	0	9	17	0	0	17
Pacific	6	3	3	0	3	0	6	0	0	3

PNEUMONIA DEATH RATES

91 cities	44	55	57	49	53	54	[2] 54	53	[12] 54	57
New England	35	70	40	31	38	43	42	38	[5] 39	52
Middle Atlantic	56	65	72	57	62	61	[6] 61	60	72	71
East North Central	32	40	38	38	44	47	47	43	28	35
West North Central	38	36	56	51	47	39	[8] 44	45	27	33
South Atlantic	49	54	79	60	60	51	66	41	[9] 65	62
East South Central	59	52	103	52	59	75	[10] 51	60	59	90
West South Central	50	27	77	86	61	78	[11] 56	121	92	78
Mountain	51	96	77	61	60	61	69	61	120	35
Pacific	18	63	9	25	46	50	43	41	49	72

[2] Rochester, N. Y., Wichita, Kans., Memphis, Tenn., and Houston, Tex., not included.
[3] Montgomery, Ala., not included.
[4] Bridgeport, Conn., Syracuse, N. Y., and Columbia, S. C., not included.
[5] Bridgeport, Conn., not included.
[6] Rochester, N. Y., not included.
[7] Syracuse, N. Y., not included.
[8] Wichita, Kans., not included.
[9] Columbia, S. C., not included.
[10] Memphis, Tenn., not included.
[11] Houston, Tex., not included.
[12] Bridgeport, Conn., and Columbia, S. C., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended August 9, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended August 9, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		5			
New Brunswick					4
Quebec			1		21
Ontario	6		10	3	7
Manitoba					2
Saskatchewan			13		
Alberta			2		1
British Columbia			1	1	2
Total	6	5	27	4	37

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended August 16, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended August 16, 1930, as follows:

Disease	Cases	Disease	Cases
Chicken pox	9	Scarlet fever	26
Diphtheria	17	Smallpox	2
Erysipelas	1	Tuberculosis (pulmonary)	25
Leprosy	1	Tuberculosis (other forms)	5
Measles	1	Typhoid fever	17
Mumps	3	Whooping cough	25
Poliomyelitis	1		

VIRGIN ISLANDS

Communicable diseases—July, 1930.—During the month of July, 1930, cases of certain diseases were reported in the Virgin Islands as follows:

St. Thomas and St. John:	Cases
Chancroid	2
Gonorrhea	4
Pellagra	2
Syphilis	19
Tuberculosis	2

St. Croix:	Cases
Gonorrhea	3
Syphilis	1
Tuberculosis	1

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30
Afghanistan	C										P[1]							
China:																		
Canton	C				3		2				2	1						
Manchuria—Dairen	C	1																
Swatow	C				3	4	3							1				
India	C	5,914	10,817	41,462	56,311	10,088	10,103	10,162	6,767	6,728								
	D	3,371	5,866	27,906	44,878	7,802	7,110	6,455	4,344	3,712								
Bassein	C			7	7													
	D			5	5													
Bombay	C		4												2			
Calcutta	C	269	354	647	609	78	73	94	77	81	53	49	37	18	10			
	D	153	220	414	372	44	36	36	63	54	28	23	23	7	7			
Negapatam	C						1											
	D						1											
Rangoon	C	3	2	1	9	1	1	2	2	1								
	D	1	2	1	3	1	1	1	1	1								
India (French):																		
Chandernagor	C	4	1	6	6			1	2			1						
	D	2	3	5	6			1	1									
Karikal	C	4	12	1					3									
	D	1	9	1					3									
Indo-China (see also table below):																		
Pnompenh	C	9		2	1	5	10	11	14	9	16	7		5	3	3		
	D	7	6		5	1	4	7	6	6	9	5	2	3	2	1		
Saigon and Cholon	C	5	14	76	160	17	19	7	5	7	1	1	1	2	2	1		
	D	4	6	55	101	11	10	2		3					1			

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30
Philippine Islands:[2]																		
Ports—																		
Cebu	C								1	20	13	13	9	5	4			
	D									9	7	12	8	4	4			
Iloilo	C										1	11	17	9	19	32	4	
	D											9	13	10	18	19	9	
Manila	C				1										1			4
Provinces—																		
Antique	C													14	4		3	
	D													7	4		2	
Bohol	C														45	67	31	
	D														26	37	15	
Bulacan	C					1			2		1	1	3					
	D					1												
Capiz	C											2		3	1			
	D											1		2	1			
Cebu[3]	C				1	13	26	118	198	313	222	115	57	63	37	4		
	D				1	11	23	50	86	131	83	60	35	37	27	3		
Iloilo[3]	C							1	1	20	45	85	66	250	227	176	88	
	D								1	10	23	64	49	146	164	119	64	
La Union	C										1							
Leyte[3]	C							21	26	11								
	D							12	7	11								
Masbate[3]	C								10	14	32	25	20	37	27			
	D								3	2	18	5	4	18	11			
Misamis, Occidental[3]	C									1	2							
	D									1	2							
Negros, Occidental[3]	C				10	5	55	50	30	62	163	172	165	178	99	50	72	
	D				7	2	27	36	23	42	90	122	104	118	72	34	47	
Negros, Oriental	C									1	1	6	17	9	2			
	D										1	3	9	3	3			
Nueva Acija	C												1					
	D												1					
Pampanga	C							1	1	2								
Pangasinan	C									2		1						

	D									2								
Rizal	C						1				1							
	D						1				1							
Samar	C														5	4	10	
	D														5	3	8	
Surigao	C														15	4	21	
	D														9	2	10	
Tarlac	C													2				
Siam	C	7	1	29	33	8	10	6	3	8								
	D	4		13	21	3	9	4	3	4								
Bangkok	C	2	2	15	0	5	3	3	1		3	4	1	1				
	D		1	4	3		3		2		1	1	1	1				
Nagara Pathom	C	1		10														
	D	1		2														
Songkla	C										8		2					
	D										4		2					
On vessel:																		
S. S. at Suva, Fiji Islands	C	1																
S. S. Sutley, at Batavia, from Calcutta	C	1																
S. S. Sassari, at Massoua, from Jeddah	C				1													
	D				1													
On small boat at Port Cebu, from Bantayan Island	C					1												
	D					1												

Place		January, 1930	February, 1930	March, 1930	April, 1930			May, 1930			June, 1930			July, 1930		
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (French) (see also table above):																
Annam [4]	C	1	4	52			60		20	3	2	14				1
Cambodia [4]	C	147	90	81	18	6		5	31	52	56	88				43
Cochin-China [4]	C	177	65	82	48			188	224	259	147	126				46

[1] Figures for cholera in the Philippine Islands are subject to correction.
[3] Figures for cholera in the Philippine Islands for the weeks ended July 12 and July 19, 1930, have been corrected since the last issue of the PUBLIC HEALTH REPORTS from late reports.
[4] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16	23
Algeria:																	
Algiers	C										1	2			1		
Constantine	C					1				1							
Oran	C											2	1		1		1
Argentina:																	
Andalgala.[1]																	
Villa Lia	D	2															
Azores: Ponta Delgada	C			8													
	D			5													
Belgian Congo	C									2				1			
	D									2							
British Africa: Gambia	C																P
British East Africa (see also table below):																	
Tanganyika	C	7		44													
	D			20													
Uganda	C	47	98	117	227	121	77	105	103								
	D	43	87	105	195	75	70	93	90								
Canary Islands: Las Palmas	D														1		
Ceylon:																	
Colombo	C	3	4	1	6	1				1	2					1	
	D	3	4	1	5	1				1	2					1	
Plague-infected rats		3	2	4		1											
Chile: Antofagasta	C	1	1	1													
	D		2	1													
Dutch East Indies:																	
Batavia and West Java	C	153	124	87	82	19	27	28	24	19							
	D	150	122	81	82	19	27	28	24	19							
Plague-infected rats		3	3	8	5	3	1								1		
Java and Madura	D	296	223	173	185	40	55	56									
Ecuador (see table below).																	

Egypt:																	
Alexandria	C	1	4	[1]2	13	3	6	6	4	8	8	3	4	2	2	4	3
	D		1	2	3	2		2	5	2	3	2	3	2	1	3	
Assiout	C			14	20	4	2	3		1	1						
	D			5	5		1		2	1	1						
Beheira	C		4														
Beni-Suef	C		4														1
Dakahlieh	C	8	5	5	11	1											
	D		1		2												
Gharbieh	C			1										3			
	D			1										1			
Girga	C			1							1						
Minieh	C				7	1	1	4	4	2	1						
	D				1		1										
Port Said	C			1	2	1			1				1	1			
France: St. Ouen	C											1					
	D											1					
Greece (see also table below):																	
Patras	C		1					1				1					
Pyrgos	C		1														
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats								1									
India	C	5,639	4,087	2,215	648	55	59	62	64	70							
	D	3,940	3,344	1,960	635	42	52	43	50	46							
Bassein	C		3														
	D		1														
Bombay	C	1	7	4	6	1		2					1				
	D	1	5	8	5			1	1				1				
Plague-infected rats		31	86	108	81	6	7	8	5	13	14	10	15	10	8		
Madras Presidency	C	230	157	44	38	26	10	3		10	1	10					
	D	140	87	19	11	15	2	5		4	1	9					
Rangoon	C	7	3	5	4				1				2	2	1		
	D	6	3	4	3				1				2	1	1		
Plague-infected rats		7	3	4	5			1		2	2		2	4			
India (Portuguese)	D				7												
Indo-China (see also table below):																	
Pnompenh	C			3	3	6					1	1			2		
	D	13	13	4	1	5	1		1		1	1					
Saigon and Cholon	C		1		1	1		1									
	D		1					1									
Iraq: Baghdad	C	6	7	6	37	12	4	8	4	10	4	2	2	4	3	2	
	D	1	4	2	18	7	3	5		5		1	1		2	1	
Japan: Osaka (vicinity of)—Plague-infected rats		6	4	3													
Kwang-Chow-Wan	C	25	7	37	34	23		8								4	
Madagascar (see also table below): Tamatave	C			1		1											
Morocco	C	48	55	121	71	2		1					1		8		
	D	13	18	45	34	4									1		
Nigeria: Lagos	C	7	13		2	1		3	1	1				2	1		
	D	7	5		2	1		3	1	1				2	1		
Plague-infected rats		42	25	7	17	1	4	1	5								
Senegal (see table below).																	

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16	23
Siam	C	17	16	5	5												
	D	13	15	6	4												
Bangkok	C	1	5		5									1	2		
	D	1	4		4										2		
Nagara Pathom	C	5	1	10													
	D	6	1	9													
Nagara Rajsima	C	2	1	1										1			
	D		1	1										1			
Syria: Beirut	C						2	5	5		2	4	3		1		1
Tunisia:																	
Sfax district	C	22		1	21	6		3					6		1		
Tunis	C	5	1	4	1		1				1	4					
	D					1					1						
Union of Socialist Soviet Republics:																	
Salsk Region	C					1			1								
	D					1											
Stavropol Region	C					1											
	D					1											
Union of South Africa:																	
Cape Province	C	2	1		P	1											
	D	1	1														
Orange Free State	C	11	5	1													
	D	3	3														
Transvaal	C	2	1														
	D		1														

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
British East Africa (see also table above):							
Kenya	C	69	85	16	171	107	36
Uganda	C	109					50
	D	90					47
Ecuador: Guayaquil	C	2	2	0			
	D	2		0			
Plague-infected rats		2	2	0			
Greece (see also table above)	C			1		1	
Indo-China (see also table above)	C	30	27	4		11	1
Madagascar (see also table above):							
Ambositra Province	C	49	25	14	1		
	D	41	20	12	1		
Antsirabe Province	C	22	38	46	19		
	D	22	36	45	19		
Itasy Province	C		4				
	D		4				
Miarinarivo Province	C	25	14	1	5	1	
	D	25	14	1	5	1	

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
Madagascar—Continued.							
Moramanga Province	C	7	5	3	1	3	
	D	4	5	3		3	
Tananarive Province	C	110	52	39	15	6	
	D	107	52	38	14	6	
Senegal:							
Baol [1]	C		18	24	13	2	62
	D		8	12	11	2	48
Dakar [1]	C			2	52	53	140
	D			2	42	117	122
Louga [1]	C	2		33	54	60	138
	D			10	27	21	103
Thies [1]	C		3	12	21	52	54
	D		2	9	8	35	30
Tivaouane [1]	C		11	71	135	43	119
	D		8	38	69	28	70

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended—														
					May, 1930				June, 1930				July, 1930				August, 1930		
					10	17	24	31	7	14	21	28	5	12	19	26	2	9	16
Algeria:																			
Algiers	C	1	5	1		1		2						1					
Constantine	C										1				1				
Oran	C		1																
Arabia: Aden	C	2	3	1									1						
Bolivia: La Paz.[1]																			
British Borneo: Sarawak	C	19																	
British East Africa (see also table below):																			
Tanganyika	C	49	103	57	33	45	55	276	385	755	196	274	64	4					
	D	8	7	14	3	5	8	54	154	90	31	26	13	2					
British South Africa:																			
Northern Rhodesia	C		9	1			57	2											
	D			2			9												
Southern Rhodesia	C	6		66	53		42	60	75	1	3		1	12	18				
	D			1	4		8	1											
Canada:																			
Alberta	C	4	10	4										2	1	2	1		
Edmonton	C	1	4	3															
British Columbia—Vancouver	C	16	20	17			2	2	1	1			2	2	1	1	1	1	
Manitoba	C	2	4	4			7	3			4								
Ontario	C	86	100	77	14	24	24	20	14	10	13	10	3	5	6	10	8	3	
North Bay	C	1			1														
Ottawa	C	11	19	21	3	10	7	5	6		8	1	1	1	4	7	5	1	1
Toronto	C						3	1	2	1	1			1					
Quebec	C											4	3						
Montreal	C																7		
Saskatchewan	C	76	47	41	20	6	10	3		12	10			2		3			
Regina	C				1		3												
Ceylon:																			
Angoda, Western Province	C	10		6															
	D	1		2															
Colombo	C	3																	
	D	2																	

China:																			
Canton	C	11	6	3					1										
	D	3	2	3															
Chungking	C	P		P	P		P	P	P			P	P	P	P	P			
Foochow	C	P		P		P		P		P		P							
Hong Kong	C	62	38	18	5	5	2		2	1	1			2					
	D	51	25	23	4	2	3		1		1	1		1					
Manchuria—																			
Harbin	C			1		10	10												
Kwantung—Dairen	C	5		2	1		7			11	5		8						
	D						4				1								
Nanking	C	P	P	P	P			P	P	P				P	P	P	P		
Shanghai—																			
Foreigners only	C	2	2	3		1	1		1	1	1	2	1	1	1	1	3		
Including natives	D	7	10	10		1	2	2	1		1	1							
Swatow	D	6	6	3	1		1	4	1		1	2	1				1		
Tientsin	C	1	2	2	1														
Chosen (see table below).																			
Colombia:																			
Barranquilla	C	102	2	1															
Buenaventura	C	1		15	2		1	1	1	1		4	4	3	2	1			
Costa Rica:																			
Port Limon	C			6				2	2										
San Jose [2]	C		10	7															
Curacao (alastrim)	C		14	2	2					1			2						
Dutch East Indies:																			
Borneo	C		185	90		10	4	2	2	10				2					
	D		12	31	1					1									
Java—																			
Batavia and West Java	C	14	78	64	1	1	5	5	1	4	6	2	3	1	3	1	1		
	D	7	6	11	1	1	3	2		1	2		2	1	1	1	1		
East Java and Madura	C			4											1				
Sanggi Islands	C	12	5	160	14	12													
	D		1	24	1	4													
Sumatra	C		48																
	D		5																
Egypt: Port Said	C			1		1								2		1			
Great Britain:																			
England and Wales	C	1,530	1,700	1,427	462	324	304	327	237	266	241	182	156	138	126	109	70	86	
Ashton under Lyne	C	29	15	18	6	3	4	4			3	4		4	2	2			
Bradford	C	2		3		1		1					1						
Cardiff	C		2	3									2						
Leeds	C	11	16	2									1						
London	C	699	710	602	222	138	148	129	130	136	125	107	84	52	62	48	36	50	
London and Great Towns	C	1,156	1,239	1,066	339	250	235	254	197	208	190	158	127	96	102	83	61	73	
	D	5	3	3															
Sheffield	C		8	2															
Stoke-on-Trent	C	41	122	85	19	9	13	21	3	10	15	4	3	2	1	3	1	1	
Scotland	C								1		3			1					
	D													1					

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16
India	C	36,036	39,329	34,843	6,533	6,549	5,416	4,337	3,686	3,559	3,174	2,552	2,258						
	D	7,710	9,109	6,983	1,449	1,814	1,196	993	1,065	913	905	648	733						
Bombay	C	638	718	430	52	68	58	40	36	35	23	19	17	15	11	7	6		
	D	314	431	270	33	49	44	35	27	23	19	10	13	9	9	2	5		
Calcutta	C	399	361	495	109	70	52	71	46	45	45	25	27	19	13	14	4		
	D	287	305	403	94	72	40	52	50	37	29	30	17	17	12	10	4		
Cochin	C	184	291	183	13	8	7	9	4	1	10	1	27		4	2	2		
	D	29	35	13	5	1	2		2	1	1		17						
Karachi	C	38	33	30		6	7	1	5		1	1				1	2		
	D	16	47	17	2		1	1	2		1						2		
Madras	C	159	173	133	24	13	15	20	9	10	8	8	6	10	17	16	19		
	D	29	36	27	4	5	6		6	3	1		4	1	3	4	3		
Moulmein	C	143	146	43	27	29	20	13		9	6	6	4	10	3	1			
	D	40	41	7	4	6	5	6		3	3	1	3	4	1	2			
Negapatam	C	1					1			1		1			1		2		
Rangoon	C	7	10	4	2		3	1	1	5	1	2	2	1	1				
	D	2	5		1						1	1							
Tuticorin	C						5				1								
Vizagapatam	C	9	69	6	3	1	1			1									
	D	1	18	2		3													
India (French):																			
Chandernagor	C	11	6	10	6	2	8	8	4	8	5	2	3	1	4				
	D	5	2	2	2	4	1				2	1	1	1	1				
Karikal	C	12	24	19	6	5	1		4	3	1	3	1		1				
	D	8	7	8	2	1			2	2	1	3	1		1				
Pondicherry Province	C	52	21	24	9	13	10	8	4	4	9	6	4	9	8	5			
	D	40	13	20	7	12	10	7	1	4	9	6	3	9	8	5			
India (Portuguese)	C	50	38	44	2	27	5	13		3	18	7	1						
	D	5	2	8		3	1	4		2	2	6							
Indo-China (see also table below):																			
Pnompenh	C				1		1	1							1				
	D			2					1						1				
Saigon and Cholon	C	4	3	5	1	1		1	1										
	D	2	1	5		1		1									1	1	
Iraq:																			
Baghdad	C	3		8	1				1				1	1	1				1
	D	1		1	1										1				1

Basra	C	1		1															
Mossoul Liwa	C	12		22	13		8			1		3	47	20					
	D	2		3	2		1			1			19	1					
Ivory Coast (see table below).																			
Jamaica (alastrim)	C							2											
Japan: Tokyo	C			1															
	D			1															
Macao	D	2	3	2	1														
Mexico (see also table below):																			
Jalisco (State) Guadalajara	D	14	22	20			6	1	4		5	6	3	1				1	
Juarez	C	3	2								6								
	D	1									1								
Mexico City and surrounding territory	C	38	106	99	30	15	17	18	17	23	20	17	10	12	4				
	D	21	31	47	6	12	8	6	5	4	3	5	2	3	1				
Progreso	C						1												
	D						1				1								
San Luis Potosi	C	1																	
	D	1																	
Morocco (see table below).																			
Nigeria: Lagos	C	2	1	1								1							
Philippine Islands: Sarangani and Balut Islands	C	3																	
Poland	C	2		7		1		2											
Portugal: Lisbon	C	7	7	8	6		2		1		2	7		7		6		6	
Rumania	C	1	2																
Siam	C	2		8	2								2						
	D			4															
Somaliland, British: Boales	C	19	2																
	D	2	6																
Spain	C									4		8		1	1	3	2		
Straits Settlements	C		5	5	1	3	2	5	5		1	3	1	2	7	1	1	1	
	D		1	2		1	1	1	1		1		1	1	1				
Sudan (Anglo-Egyptian)	C	79	60	42		5	13	1	4	8	1	54	8	1		3			
	D	6	5	4			1	1				3		1					
Sudan (French) (see table below).																			
Switzerland: Berne Canton	C															1			
Syria (see table below).																			
Taiwan: Taihoku (see table below).																			
Tunisia: Tunis	C	3	3	4		1		1			2					1			
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P	P											
Orange Free State	C	P	P																
Transvaal	C	P	P																
Upper Volta	C	26	2	3				1			8	5							
Zanzibar	C		13																
On vessel:																			
S. S. Tairoa, at Liverpool, from London	C	1																	
S. S. Karagola, at Lourenco Marques, from India	C	1																	
S. S. Elysia, at Port Sudan, from Bombay	C			1															
S. S. Naldera, at Port Said	C				1														
S. S. Manoa, from Honolulu to San Francisco	C											1							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		January, 1930	February, 1930	March, 1930	April, 1930			May, 1930			June, 1930			July, 1930		
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (see also table above)	C	460	434	26	261				173	132	80	133				238
Ivory Coast	C			7												
Sudan (French)	C	229	213	609	371		150	40	56	178	76					
	D	25	11	49	30		6	7	7	18	18				34	
Syria: Beirut	C	70	18	17	10	2	7			7	6	1				2
Taiwan: Taihoku	C		43	58	10	2										

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
British East Africa (see also table above):							
Kenya	C	12	12	175	174	171	142
Uganda	C	184	109			78	
	D	155	99			69	
Chosen	C	1	4		5		
	D		1		1		
France	C	9	23	8		3	
Mexico: Durango (see also table above)	D	12	6	5	4	4	3
Morocco	C	29	74		10	18	5
Turkey	C	215	114		3	16	
	D	66	42				

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Feb. 9-Mar. 8, 1930	Mar. 9-Apr. 5, 1930	Apr. 6-May 3, 1930	Week ended— May, 1930: 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9
Algeria:																		
Algiers	C	4	6	8	1	2	4	8	2		1			1	2	3		
Constantine Department	C	5	11	15		4		2	11		1			1	1			
Oran	C							3				4		2	1			1
Arabia: Aden	C		1															
	D		1															
Bolivia: La Paz.[1]																		
Brazil: Porto Alegre	C	2			1													
Bulgaria	C	13	9	15	1		5		1		9	6		4	5	1		1
	D	1		1	1		1		1						1			
China:																		
Manchuria—Harbin	C	1	4	52					2									
Shanghai	C		1															
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C			1							1	1	1					
Beheira Province	C	18	2	2	9	21	9	10	17	16	7	5		5	1	9		
	D	5			4	4	4	1	1	1		2		1		1		
Cairo	C	1															2	
Port Said	C	1																
Great Britain: Scotland—																		
Dunfermline	C													1				
Glasgow	C					1												
	D					1												
Greece (see table below):																		
Iraq: Baghdad Liwa	C		2															
Ireland:																		
Irish Free State—																		
Galway County—Oughterard	C															2		
Kerry County—Dingle	C			5														
Leitrim County—Mohill	C											9				1		
Mayo County—																		
Ballina	C							2		1				1				
Swinford	C					7	7											
Westport	C														2		1	

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9-Mar. 8, 1930	Mar. 9-Apr. 5, 1930	Apr. 6-May 3, 1930	Week ended— May, 1930: 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9
Ireland—Continued.																		
Irish Free State—Continued.																		
Roscommon County—																		
Roscommon	C														1			
Strokestown	C														1			
Wicklow County—Shillelagh	C									1		3	1		1			
Northern Ireland—Cookstown	C	3																
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico: Mexico City, including municipalities in Federal District	C	9	4	4		2		4	2	3	1	3	2		2			
	D		1	4				3		1								
Morocco	C	21	38	15	3	6	1	1	1		6	8		4	3	4		
	D		7	3														
Palestine	C	1	6	1		2			2				3	1	1	1		1
Poland	C	183	228	243	64	45	34	26	39	15	26	37		24		12	10	
	D	8	13	15	2	2		1	3	3	2	3		4			1	
Portugal:																		
Lisbon	C			4														
Oporto	C	1	2	1														
Rumania	C	293	185	186	60	58	61	48		32								
	D	23	12	11	10	11	6	8		3								
Spain: Valencia	C									2		1		3				
	D													1				
Tunisia	C	3			2	2	1	1			2	16			14	10	2	5
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P			P	P	P	P				
Natal	C	3	P	P	P	P		P			P		P	P				
Orange Free State	C	P	P		P	P	P	P			P	P	P	P				
Transvaal	C			P														
Yugoslavia (see table below).																		

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
China: Harbin	C	----	----	37	204	240	----
Chosen: Seoul	C	----	17	----	3	----	----
Czechoslovakia	C	10	2	42	29	12	----
Greece: Athens	C	12	6	3	1	3	3
Latvia	C	18	----	----	----	3	3

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
Lithuania	C	2	70	62	73	27	16
	D	----	5	4	4	----	----
Turkey	C	2	3	1	3	16	2
Yugoslavia	C	26	33	46	22	16	6
	D	3	5	2	4	1	----

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

X

UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

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SEPTEMBER 12 - - 1930

SPECIAL ARTICLES

B. Psittacosis Nocard Not Found in Recent Epidemic
An Outline of College Courses in Child Hygiene
Measures Used in the Antiplague Campaign in Ecuador

UNITED STATES
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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

VOL. 45 SEPTEMBER 12, 1930 NO. 37

BACILLUS PSITTACOSIS Nocard, 1893

Failure to find it in the 1929–30 Epidemic in the United States [1]

By SARA E. BRANHAM, *Bacteriologist;* GEORGE W. MCCOY, *Director, National Institute of Health; (formerly Hygienic Laboratory)* and CHARLES ARMSTRONG, *Surgeon United States Public Health Service*

The recent invasion of psittacosis into the United States and other countries has aroused new interest in "*B. psittacosis,*" that member of the *Salmonella* group of bacteria which was found by Nocard (1) in the marrow of parrot wings in 1892, and shown by him to be lethal for birds and other laboratory animals when injected.

This organism has been isolated from sick or dead parrots by several investigators. It has not been found with regularity, however, and the only record of its having been isolated from a human case of psittacosis seems to be the report of Gilbert and Fournier (2), who found it both in the blood of their patient at autopsy and in the parrot with which the patient was associated.

Sicard (3) found Nocard's *B. psittacosis* in the blood and bone marrow of a parrot that was associated with five cases of psittacosis in one family. Strains that seemed to be identical with Nocard's bacillus were found by Eckersdorff (4) in the blood of a dead parrot; by Bachem, Selter, and Finkler (5) in the blood and viscera of two newly imported gray parrots which they had kept in the same room, and which became sick soon after arrival; by Perry (6) from several gray touracous, and (7) from other birds in an epidemic in the London Zoo; and by Lignieres (8) from the bone marrow of a parrot which had been infected with material from a human case during the recent epidemic in the Argentine. Bedson, Western, and Simpson (9), during their recent studies, found one strain in a parrot not known to have caused a human case; and we have received one strain from Arnold (10) who isolated it from a parrot in Illinois during this present outbreak. Krumweide, McGrath, and Oldenbusch (11) have found one strain in the course of their investigations

[1] From the National Institute of Health, Washington, D. C.

in a parrot in which the pathological findings were distinctly different from those of their other birds, and which was not associated with a human case. Elkeles (12) isolated a strain from a parrot which sickened soon after its importation, and cites the reported cultivation of a strain by Santillan from a parrot in Argentina.

B. psittacosis has been reported by both Perry (7) and Bainbridge (13) to be identical with *S. aertrycke*. Medical literature abounds with reports proving the pathogenicity of *S. aertrycke* for many animals. It is the most common cause of food poisoning in man; many epizootics have been reported among guinea pigs, rabbits, rats, and mice; it has been isolated from sheep, calves, and canaries.

Agglutinins for *B. psittacosis* have been reported not infrequently in the blood of patients ill or convalescing from the disease. Usually these have been demonstrable only in very low dilutions, and do not seem ever to have been found in titers higher than those Rosher (14) found in the blood of normal people.

During the recent investigations carried on at the National Institute of Health (Hygienic Laboratory), a careful search was made for Nocard's organism, both in parrots and in human cases, and also for agglutinins for this bacterium in the blood of convalescents. There can be no doubt that much of the material cultured represented true psittacosis, since 7 of the 12 parrot carcasses and all 3 of the samples of droppings received from a distance are known to have been associated with human infection. That psittacosis was successfully established experimentally in parrots and parrakeets in the laboratory is indicated not only by the illness and death of the experimental birds, but also by the occurrence of 11 characteristic cases among the laboratory personnel during the time of these experiments (15).

The bacteriological studies were made from the above-mentioned 12 parrot carcasses and 3 samples of droppings from parrots ill of psittacosis, from 4 parrots and 8 parrakeets in which infection was produced experimentally; from blood, sputum, urine, or feces from 4 human cases of psittacosis; and from the organs of one fatal human case, as well as from 12 normal parrots obtained for experimental work.

The localities from which the parrot carcasses and droppings were received, information concerning their association with human cases of psittacosis, and the materials taken from the birds for bacteriological examination are listed in Table 1.

TABLE 1.—*The nature and source of materials shipped to the National Institute of Health (Hygienic Laboratory) and studied bacteriologically*

Identification and source	Material received	Date received	Associated with human cases	Material examined bacteriologically
		1930		
A. Baltimore, Md	Parrot carcass	Jan. 16	1 human case	Heart, liver, lung, kidney, bone marrow, small intestines, and caecum.
B. Zanesville, Ohio	do	Jan. 18	do	Heart, liver, lung, bone marrow, small intestines, and caecum.
C. Miami, Fla	Combined droppings of 2 parrots.	Jan. 17	2 fatal human cases	Droppings.
D. Crisfield, Md	Parrot carcass	Jan. 21	1 human case	Heart, liver, lung, kidney, bone marrow, and intestines.
E. Baltimore, Md	Parrot droppings	do	Several human cases, actual number unknown.	Droppings.
F., G., H. Toledo, Ohio.	Parrot carcass	Jan. 27	At least 20 human cases and possibly a number more.	Heart, liver, bone marrow, and intestines.
I. Bangor, Me	do	Jan. 28	Unproved	Heart, liver, lung, kidney, bone marrow, intestines, and peritoneal fluid.
J. Trenton, N. J	do	Feb. 17	2 human cases	Liver, lung, muscle, bone marrow, and intestines.
K., L., M., N. Rosebank, N. Y. Quarantine station.	do	Feb. 26	None	Heart, liver, lung, muscle, bone marrow, and intestines.

The experimentally infected birds which were studied bacteriologically, their treatment, the number of days between infection and death, and the materials cultured are listed in Table 2.

TABLE 2.—*The nature and source of materials studied bacteriologically from experimentally infected birds*

No.	Bird	Treatment	Number of days between infection and death	Material examined bacteriologically	Remarks
1	Parrot No. 4	Exposed to droppings of C.	11 days	Blood and droppings during illness; blood, liver, lung, kidney, bone marrow, muscle and intestines at autopsy.	This bird was killed with ether while acutely ill.
2	Parrakeet No. 1	Injected intramuscularly with emulsion of organs from carcass B.	4 days	Heart, liver, lung, bone marrow, and intestines.	
3	Parrakeet No. 2	do	6 days	Heart, liver, lung, kidney, bone marrow and intestines.	
4	Parrakeet No. 6	Injected subcutaneously with emulsion of organs from parrakeets No. 1 and No. 2.	7 days	Heart, liver, lung, muscle and emulsion of organs.	Chloroformed when practically moribund.
5	Parrakeet No. 10.	Injected intramuscularly with emulsion of organs from parrakeet No. 6.	13 days	Heart, liver, lung, muscle, and intestines.	
6	Parrot No. 5	Put into a cage with carcass B.	28 days	do	
7	Parrot No. 3	Put into a cage with carcass A. After 15 days fed sputum from human case No. 1.	31 days after first exposure to infection; 15 after being fed sputum.	do	
8	Parrakeet J	Injected intramuscularly with emulsion of droppings of E and also with human convalescent serum.	8 days	Heart and liver	

TABLE 2.—*The nature and source of materials studied bacteriologically from experimentally infected birds*—Continued

No.	Bird	Treatment	Number of days between infection and death	Material examined bacteriologically	Remarks
9	Parrakeet B	Injected intramuscularly with a Berkefeld N filtrate of droppings of E.	10 days	Heart, liver, lung, muscle and intestines.	
10	Parrakeet H	Injected intramuscularly with emulsion of droppings of E and also human convalescent serum.	11 days	do	
11	Parrakeet D	Injected intramuscularly with a Berkefeld N filtrate of droppings of E and also human convalescent serum.	14 days	do	
12	Parrot No. 14	Fed droppings of parrot No. 4.	(?)	do	

The 12 normal parrots obtained for experimental work were examined within a few days after their arrival at the laboratory and before any work with them had been begun. Several of these were studied again when they were autopsied after being experimentally infected, viz, Nos. 3, 4, 5, and 14 (see Table 2). Both mouth swabs and the droppings of all 12 birds were cultured.

The human cases of psittacosis from which material was obtained for study were as follows:

No. 1.—A fatal case. Samples of blood, sputum, feces, and urine were examined throughout the course of the infection, and liver, lung, and spleen were examined after death.

No. 2.—Blood culture.

No. 3.—Blood culture.

No. 4.—Samples of urine and feces throughout the course of illness.

Cases Nos. 2, 3, and 4 recovered.

Blood and urine were plated directly on glucose blood agar and Endo agar, and small quantities were added directly to veal infusion glucose broth. Bits of the various organs were smeared on Endo medium and blood agar plates, and small pieces were placed in the broth. Fecal material was emulsified in broth or salt solution, and then the emulsion was streaked upon Endo and blood agar. With feces, preliminary cultures in brilliant green broth were made, since many of the bacteria ordinarily abundant in these materials are definitely inhibited by brilliant green. These were subsequently plated out upon the Endo medium. Sputum was streaked upon blood agar and Endo. The mouth swabs from normal parrots were streaked directly upon Endo agar.

After incubation of the plate cultures, small colorless colonies were picked and inoculated on Russell's double sugar medium and

on plain agar, or blood agar. Further study of these was made as seemed indicated.

Four hundred and twenty-six colonies were picked. Approximately 100 of these were Gram-negative rods suggesting the colon-paratyphoid-typhoid-dysentery group of bacteria. These were replated on Endo medium to determine their purity and single colony cultures were used for further study.

A number of cultures proved to be members of the *coli* and *aerogenes* groups. Fifty strains failed to ferment lactose. Many of these fermented no sugars at all and apparently fell into the genus *Alcaligenes*. Others, giving a typical "paratyphoid reaction" on Russell's double sugar medium, liquefied gelatin readily, and were identified as belonging to the genus *Proteus*. Occasionally a strain of *Pseudomonas* (*B. pyocyaneus*) was found. Seven cultures seemed at first to belong to the *Salmonella* group; they produced a typical paratyphoid reaction in Russell's medium and in litmus milk, and failed to liquefy gelatin. But four of these produced indol abundantly and the other three were shown slowly to ferment lactose after a week of incubation. These last three bore some cultural resemblance to *Salmonella suipestifer*, since they did not blacken lead acetate medium, and fermented xylose and arabinose very slowly and trehalose not at all. But the slow lactose fermentation, a peculiar odor like that of decaying fish (probably due to production of tri-methyl amine), and failure to agglutinate with any of the *Salmonella* antisera with which they were tested, showed that these three strains were not members of the *Salmonella group*. The agglutination tests were made with antisera for "*B. psittacosis*", *S. aertrycke, S. paratyphi* (Para A), *S. schottmülleri* (Para B), *S. enteritidis, S. columbensis, S. suipestifer,* and *Eberthella typhi* (*B. typhosus*) in dilutions of 1–40 to 1–3,200. Antigens homologous for the sera used were well agglutinated, but there was no trace of agglutination with any of the strains isolated from the parrots. Throughout this bacteriological study we found no strain of any member of the *Salmonella* group of bacteria.

Three cultures of *B. psittacosis* have been sent to us: One, which we received through the kindness of the New York State Laboratories at Albany, came originally from the Pasteur Institute in Paris; another came from Dr. Lloyd Arnold, of Chicago, Ill., and was isolated by him from a parrot during the recent epidemic; and the third was received from Dr. Lignieres, of Argentina, South America, and was isolated from a parrot which had been injected with material from a human case. These three strains are closely related to each other and to *S. aertrycke* serologically, though they differ in some of their biochemical reactions. The strain received from New York failed repeatedly to ferment maltose or starch, split trehalose and xylose very slowly, and produced a much less marked degree of alkalinity

in litmus milk than the other two strains, which seemed to be identical in their action upon 24 carbohydrates studied.

Fifty-seven samples of blood collected from 45 different patients at varying intervals from the second to eighty-fourth day following the onset of symptoms were tested, in dilution from 1 : 20 to 1 : 640, against two strains of *B. psittacosis* (one secured from New York State Laboratories and one from Argentina), and one strain each of *S. aertrycke*, *S. enteritidis*, *E. typhi* (*B. typhosus*), *S. paratyphi* (*B. paratyphosus* A), and *S. schottmülleri* (*B. paratyphosus* B.) (see Table 3).

Partial agglutination in the lower dilutions was secured with some of the sera for one or more of the antigens. The presence of agglutinins in such low concentration with this group of organisms is not to be considered of diagnostic importance. "*Proteus* X_{19}" was tested against seven of these sera with wholly negative results.

TABLE 3.—*Results of agglutination tests using patients' sera and various antigens*

[0=no agglutination in any dilution; 4+ =complete agglutination; 2+ and 3+ =degrees of agglutination

Sample number	Number of days from onset of illness to taking of blood	"B. psittacosis," New York	"B. psittacosis," Argentina	S. aertrycke	S. enteritidis	E. typhi (B. typhosus)	S. paratyphi (Para A)	S. schottmülleri (Para B)	Proteus X_{19}
1	(?)	0	0	0	0	0	0	0	0
2	2	0	2+ in 1-20	0	0	0	0	0	
3	6	0	0	0	0	0	0	0	0
4	84	0	0	0	0	0	2+ in 1-20	0	
5	35	0	0	0	0	0	0	0	0
6	11	0	0	0	0	0	3+ in 1-20 2+ in 1-40	0	
7	72	0	0	0	0	2+ in 1-20	0	0	
8	(?)	0	0	0	0	0	3+ in 1-20 to 1-40 2+ in 1-80	0	
9	21	2+ in 1-20 1+ in 1-40	2+ in 1-20	2+ in 1-20	0	2+ in 1-20	3+ in 1-20 2+ in 1-40 to 160	0	
10	(?)	0	0	0	0	0	0	0	
11	22	0	0	0	0	0	4+ in 1-20	0	
12	(?)	0	0	0	0	0	0	0	
13	(?)	0	0	0	0	0	0	0	
14	(?)	0	0	2+ in 1-20	0	0	0	0	
15	81	2+ in 1-20	0	0	0	0	0	0	
16	6	0	0	0	0	0	0	0	
17	13	0	0	0	0	0	4+ in 1-20 3+ in 1-40 2+ in 1-80	0	
18	(?)	0	0	0	0	2+ in 1-40- 80-160	0	0	
19	11	0	0	0	0	0	3+ in 1-20	0	0
20	64	0	0	0	0	0	0	0	
21	(?)	0	0	0	0	0	3+ in 1-20	0	
22	74	2+ in 1-20	2+ in 1-20	0	0	0	0	0	
23	(?)	0	0	0	0	0	3+ in 1-20 2+ in 1-40	0	0
24	(?)	0	0	0	0	0	0	0	
25	53	2+ in 1-20	0	0	0	0	0	0	
26	8	2+ in 1-20	0	0	0	0	0	0	
27	11	0	0	0	0	0	0	0	
28	(1)	2+ in 1-20 2+ in 1-40	2+ in 1-20 2+ in 1-40	0	2+ in 1-20	4+ in 1-20 3+ in 1-40	0	0	

[1] Not psittacosis.

TABLE 3.—*Results of agglutination tests using patients' sera and various antigens*—Continued

Sample number	Number of days from onset of illness to taking of blood	"B. psittacosis," New York	"B. psittacosis," Argentina	S. aertrycke	S. enteritidis	E. typhi (B. typhosus)	S. paratyphi (Para A)	S. schottmülleri (Para B)	Proteus X_{19}
29	20	0	0	0	0	0	0	0	
30	(?)	0	0	0	0	0	0	0	
31	(?)	0	0	0	0	0	0	0	
32	(?)	0	0	0	0	0	3+ in 1-20 2+ in 1-40	0	0
33	(?)	0	0	0	0	0	0	0	
34	(?)	0	0	0	0	9	0	0	
35	(?)	0	0	0	0	0	2+ in 1-20 to 1-40	0	
36	24	0	0	0	0	0	0	0	
37	72	2+ in 1-20	0	0	0	0	0	0	
38	(?)	0	0	0	0	0	3+ in 1-20	0	
39	(?)	0	0	0	0	0	0	0	
40	12	0	0	0	0	0	3+ in 1-20 3+ in 1-40 3+ in 1-80	0	0
41	9	0	0	0	0	0	4+ in 1-20 2+ in 1-40	3+ in 1-20 2+ in 1-40	0
42	66	0	0	0	0	0	0	0	
43	50	0	0	0	0	0	0	0	
44	62	0	0	0	0	2+ in 1-20 to 1-80	2+ in 1-20	0	
45	40	0	0	0	0	0	0	0	
46	3	0	0	0	0	0	0	0	
47	71	0	0	0	0	0	0	0	
48	76	0	0	0	0	0	0	0	
49	66	0	0	0	0	0	0	0	
50	84	0	0	0	2+ in 1-20	0	0	0	
51	(?)	0	0	0	0	0	2+ in 1-20 to 1-40	0	
52	33	0	0	0	0	0	3+ in 1-20 2+ in 1-40	0	
53	33	0	0	0	0	0	2+ in 1-20 to 1-40	0	
54	45	0	0	0	0	0	0	0	
55	(?)	0	0	0	0	0	0	0	
56	31	0	0	0	0	0	2+ in 1-20 to 1-40	0	
57	34	0	0	0	0	0	0	0	

SUMMARY

During the recent outbreak of psittacosis in the United States an intensive search for the "*Bacillus psittacosis*" of Nocard was made in the carcasses and droppings of parrots that were shipped to the National Institute of Health, in experimentally infected and in normal parrots and parrakeets, and in material obtained from human cases. No strain of "*B. psittacosis*" or of any other member of the *Salmonella* group of bacteria was found.

In 57 convalescent sera studied, agglutinins for "*B. psittacosis*" and other *Salmonella* bacteria were not demonstrable in dilutions that could be considered significant.

We have found no evidence of the association of any member of the *Salmonella* group of microorganisms with psittacosis either in birds or in man.

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A COLLEGE COURSE IN CHILD HYGIENE

By E. Blanche Sterling, *Acting Assistant Surgeon, United States Public Health Service*

The care and training of children is largely in the hands of women. The mother prepares for the child's coming; she watches over his infancy and guides his feet through the runabout preschool years. When he reaches school age, she sends him to a school where most of the teachers are women; and the parent-teacher associations are overwhelmingly feminine in their make-up.

This association of women with children is a very close, and, in early childhood, a natural one; therefore, any sound instruction in child hygiene that can be given to the women of the country will undoubtedly forward the cause of child health.

Not only do women care for their own children, but many of them are interested in the welfare of all children. This is shown by the programs of the various women's organizations, a very large number of which have child welfare committees. Many of such organizations are concerned only with child welfare.

Volunteer organizations of groups of earnest women ready and willing to work should be able to accomplish a great deal. The fact that they do not always accomplish as much as they should is due largely to the fact that the women have little knowledge of community hygiene and its relation to child hygiene. Without such knowledge there is likely to be duplication of effort, failure to utilize the means at hand, futile struggles with an incomplete program, and the haphazard results of isolated effort. The training of these intelligent women in

the principles of public health in relation to the health of the child would turn this stream of misdirected effort into channels of wide usefulness and accomplishment.

It would seem that one of the best fields for this training is to be found in the high-grade women's colleges of the country. These institutions turn out a body of women with trained minds who would naturally become leaders among the women of their several communities. With their senior and graduate students taking such a course as that outlined below, the growth of the child hygiene movement would receive a tremendous impetus. By an act of the Seventy-first Congress the Public Health Service has been empowered to help in educational institutions in "the dissemination of information relating to public health." It is felt that such work would be a most constructive contribution to child hygiene. Following is a proposed outline of a college course in child hygiene:

I

Eugenics

(1) Various social classes in the population.
(2) The birth rate in the various classes.
(3) The well-bred human being.

II

Prenatal hygiene

(1) Personal hygiene of pregnancy.
(2) Community hygiene of pregnancy:
  (*a*) Official and nonofficial agencies.
  (*b*) Prenatal clinics.
  (*c*) Hospitalization.
  (*d*) Public health nursing.
(3) Social aspects of prenatal hygiene:
  (*a*) Poverty.
  (*b*) Employment.
  (*c*) Legitimacy.
(4) Legal aspects of childbearing:
  (*a*) Mothers' pensions.
  (*b*) Legal age of marriage.
  (*c*) Relation of industry to childbearing.

III

Infant hygiene

(1) Physical care of the infant.
(2) Infant's environment and its effects.
(3) Community infant hygiene:
  (*a*) Infant welfare clinics.
  (*b*) Public health nursing.
(4) Public health and sanitation in relation to infant hygiene.

IV

Preschool hygiene

(1) Care of the runabout child.
(2) Physical defects in the runabout child.
(3) Preparation for school, including immunization.
(4) Child guidance.

V

School hygiene

(1) The relation of the department of health and the department of education to school health supervision.
(2) The function of the teacher, the nurse, and the physician in school health work.
(3) Construction and sanitation of school buildings and surroundings.
(4) Medical inspection of pupils.
(5) Physical defects and methods of securing corrections.
(6) School nursing.
(7) Control of communicable diseases.
(8) Nutrition of the school child.
(9) Physical training.
(10) Health education.
(11) Hygiene of instruction.
(12) Mental hygiene.
(13) Special classes for the handicapped child.

CHIEF ETIOLOGICAL FACTORS OF PLAGUE IN ECUADOR AND THE ANTI-PLAGUE CAMPAIGN

By C. R. Eskey, *Surgeon, United States Public Health Service*

(The first part of this paper, dealing with the general etiological factors of plague in Ecuador, was published in Public Health Reports for September 5, 1930. [1])

II. ANTIPLAGUE MEASURES

MEASURES PREVIOUSLY IN USE

Trapping and poisoning to reduce the rat population of Guayaquil were instituted by Surg. B. J. Lloyd, of the United States Public Health Service, who was made acting director of health when plague first appeared; and these measures have continued to be used with varying degrees of intensity ever since. During 1925, 1926, and 1927, over 250,000 rodents were caught each year. About 60 per cent of the rodents caught have always been mice, so that the yearly rat catch during the years named above was about 100,000. In 1928 the number of trappers was reduced and the rodent catch fell that year to 214,000, and in 1929 to 153,000. The number of rats caught per 100 traps a day has not varied much in the past five years and has usually averaged from 13 to 11 each month. Cage traps formed about two-thirds of the trappers' equipment of 75 traps.

[1] The complete article will be issued later as a single reprint.

On September 1, 1929, the trapping division consisted of a chief inspector, two field inspectors, and 14 trappers. There were 754 cage traps and 336 snap traps in use.

Poison is believed to have been used more intensely at the beginning of the epidemic than in recent years. During the past few years barium carbonate and flour were employed in a desultory manner. Only one man was engaged in preparing and placing poison.

A cursory macroscopical and microscopical examination was made of most of the trapped rats by a part-time local physician. No particular attention has been given to an area in which a plague infected rat was reported.

Discovery of plague cases has always depended upon the reports of physicians or an investigation of the cause of death. It is believed that many cases have occurred which were never reported. All cases of plague have been assigned to infections contracted in the place of residence and apparently no cases have been traced to places of occupation.

An inspector and five or six men visit, within a day or so, every house where plague is reported. They open up most inclosed spaces which may harbor rats in the infected house and treat the interior with hot lye solution. Clothing is boiled. Houses have few furnishings in them, so that practically everything can be treated with lye solution. Usually 100 traps are placed in the infected house and vicinity. The frequency with which secondary, tertian, and even quartan cases have been reported at the same address during the past five years indicates that the treatment of infected premises has been rather futile.

An infectious disease hospital to which plague cases are removed for treatment has been in operation since the first years of the epidemic in Guayaquil.

CONSTRUCTION OF BUILDINGS

There are three general classes of buildings in Guayaquil: Concrete modern buildings more or less rat proof, which number about 100; wooden buildings that compose the bulk of the structures in the main central part of the city; and cheap bamboo houses or shacks. These latter buildings have side walls of split bamboo which do not permit rat harborage, single floors, and usually ceilings that are not inclosed, so that they do not offer much rat harborage within them. They all have raised floors under which rats may live except in the rainy season. The bamboo houses or shacks are usually isolated structures, so that party walls are not common. Some are two stories high, but many are only one. They form the chief buildings in the outskirts of the city, but are also found in the central section, except the better class business area.

It is doubtful whether the buildings of any other place in the world offer more extensive and better rat harborage than the wooden buildings in Guayaquil. They are built in solid blocks without openings except doors and windows, and the inclosed space of party walls harbor many rats. There is an open space or patio within each that extends from the ground or first floor and is open at the top, so that rats are not hindered in their passage to any part of the building. These buildings are all occupied in apartment-like manner. The first floor is frequently some type of store or warehouse. The wealthier people occupy a whole floor, but those buildings in which the poor people live are overcrowded to an unbelievable extent. Individual houses of the better class can be counted on the fingers.

For a number of years there has been a law prohibiting double floors and walls in new structures and requiring their removal in the old buildings. This law has been pretty generally enforced, so that this type of rat harborage is rarely seen; but construction practically as bad is used at the present time. It consists in boxing in all the rough-hewn joists and beams. For appearance the boxing is often made larger than necessary, forming the kind of harborage so frequently encountered on ships. The second floor of all the wooden buildings extends over the sidewalk and is supported by uprights at its outer side. The uprights are boxed in the same manner as are those in the interior, but usually the boxing is excessively large and ornate. There are nearly always openings at the bottom of the outside uprights through which rats can pass, and at the top they may enter the boxing of the horizontal beams.

The first floor of all buildings, except a few of concrete and some remodeled business places, is raised from a few inches to 2 feet or more above the ground, and the sides are inclosed, with occasional windows for ventilation. The open places are sometimes screened, but more often they are only closed with strips of wood to keep large animals out. Ceilings are usually inclosed, and the roofs are commonly of tile. Rats may pass through the curved tiles to the ceiling space underneath.

An inspection was made on the first of September of the stores handling grains and other foods, the bakeries, and rice mills. Stored articles were found piled in helter-skelter fashion everywhere, and evidence of rat infestation was seen in every storeroom visited. There were innumerable openings to the places where foods were stored and sold through which rats could and did pass from all parts of the building. Only one fairly ratproof warehouse was found in the city, and it had grilled windows through which rats entered, as evidence by holes gnawed in sacks of flour. Two rice mills located on the river bank which is notoriously rat-infested, had no protection against the depredations of the rats, as the rice was piled on a wooden floor

with a roof and no side walls. The two large markets would be fairly ratproof if the stands in them were not raised about 6 inches above the floor and the innumerable openings in their gates and side walls were closed so that rats of the whole neighborhood could not enter them. Plague has been particularly prevalent in the vicinity of the two markets.

From the above description of the extensive rat harborage and evidence of rat infestation, some idea can be gained of the apparent hopelessness of attempting to ratproof the buildings, in fact ratproofing would practically require rebuilding. More stringent laws for new buildings and the ratproofing of food warehouses and the large markets would help the situation. The possibility of reducing the rat population by any known measures seemed hopeless.

GARBAGE DISPOSAL

Guayaquil has a garbage collection system that is very simple but also very unsatisfactory. Toward evening the householder merely dumps his garbage in the street in front of his house. In the small section of the city where there is pavement, the garbage is collected direct by an automobile garbage truck during the evening and night. Many people on the main streets hold their garbage until the trucks arrive, but not all. Most of the streets are not passable for motors, especially in the rainy season; and here all the garbage is dumped in the street to be collected some time during the night by a man with a wheelbarrow. He picks up the garbage with a shovel and broom in the dark and, consequently, is unable to see whether he gets all of it. These garbage piles are feeding places for stray dogs, cats, and rats. The garbage is dumped in a low area on the outskirts of the city and is not treated. Plague has appeared in houses not far from the garbage dump a number of times.

DETERMINATION OF THE DISTRIBUTION OF PLAGUE

Spot maps made for human cases of plague that have been reported in the past five years and during 1929 showed that the disease might occur in any block in the city, but that the central section suffered most. The section of the city in which plague occurs most is that composed of old wooden buildings in which the poorer people live and where congestion is excessive. The three sections of the city in which plague has been most prevalent during the past five years are as follows: The greatest number of cases were in the vicinity of the large central market which is located in the mathematical center of Guayaquil; the second badly infected area lies between the river market and the small section of the city occupied by most of the wholesale grain stores; and the third area is adjoining the customs

warehouse in which flour and other foods are stored for several days after being removed from ships.

It has already been shown that plague has its lowest incidence from May to October and that there are frequently months during this part of the year when no cases are reported. It is during this period that the disease is carried over to the active season by a small number of infected rats; and the places in which human cases are reported can be considered the endemic area. A spot map was prepared to show the location of all human cases from May to October. It was found that all cases with the exception of three or four during the past five years were located in the central part of Guayaquil in the same region in which the greatest number of cases were found to occur.

ANTIPLAGUE MEASURES OF THE PRESENT CAMPAIGN

At the time when the present campaign to reduce the incidence of plague in Guayaquil and Ecuador was underway, the financial stringency of the country was such, because of the reduced cacao exports, that it was impracticable to have any legislation passed to improve the rat proofing of buildings. Therefore, results had to be obtained without changing the structural condition of a single building and with very little funds to work with. The Government agreed to provide 30,000 sucres ($6,000) to be used during the last four months of 1929 and not reduce the appropriation for 1930 for public-health work by 90,000 sucres ($18,000) as had been planned, and that this money would be available for fighting plague. These funds were to be used not only in Guayaquil but for activities throughout Ecuador where plague was found.

With the small sum of money allotted it has been possible to more than double the trapping activities and to keep up a constant broadcasting of poison. In September the number of field inspectors was increased to 4 and trappers to 28. The number of traps in active use has been increased from time to time until on March 1 practically 6,000 were in use, and each trapper had all the traps possible for him to attend efficiently. These traps consisted of 900 cage and 5,100 snap traps on March 1, 1930.

POISON

The use of poison to destroy rats has been in practice for years, but this measure was seldom employed with the intensity adopted in the past few months in Guayaquil. It is not believed that the value of poison in antiplague work has been as generally recognized as it should be. Surg. J. D. Long, of the United States Public Health Service, under whose direction this campaign was conducted, had successfully used poison in eradicating plague at Oakland, Calif., and in Manila. The conditions in Manila are somewhat similar to those in Guayaquil.

The form in which the poison is used in Guayaquil is unique, and that city is probably the only place in which paper poison packages have been employed to fight plague. The paper packages of poison were devised some years ago by Mr. Cajas, the inspector in charge of plague activities in Guayaquil.

The preparation of poison packages is very simple, and they are made by 12 to 18 boys from 10 to 14 years old. The mixing of the ingredients, all of which are dry powders, is done by two men. The papers containing the poison are three inch squares, made by cutting up an ordinary thin, tough grade of wrapping paper. The boys dip one end of the paper square into the powdered poison ingredients and lift out about a heaping teaspoonful, which is shifted to the center of the paper square, and the edges are then brought into contact and twisted to retain the poison, thus producing a package that is ball like at its bottom and has a pointed twisted top. The poison packages are stored in barrels in the laboratory, and as they are placed in the barrels a few at a time they are sprayed with oil of anise by means of an ordinary atomizer.

The ingredients of the poison packages have varied during the different times of placing the poison throughout the city, as follows:

First poisoning.—Flour and barium carbonate 40 per cent.

Second poisoning.—Corn meal and arsenic 18 per cent.

Third poisoning.—Flour and arsenic 18 per cent and corn meal and arsenic 18 per cent.

Fourth poisoning.—Corn meal and barium carbonate 35 per cent.

Fifth poisoning.—Corn meal, dried powdered cheese, and corn meal, dried powdered codfish, both with barium carbonate 35 per cent.

Sixth poisoning.—Same as fifth.

Seventh and eighth poisonings.—Corn meal, dried powdered codfish and arsenic 18 per cent and corn meal, dried powdered cheese and arsenic 18 per cent.

The most effective of all the above forms of poison is believed to be the mixture of dried codfish, corn meal and arsenic, especially when poison is to be used in places where grains are stored. Dried powdered cheese is also an attractive bait. All of the combinations will kill many rats, and it seems advisable to change the bait from time to time. Arsenic is a better poison to kill rats than barium carbonate, but the latter is effective, as was found during the period when the city was first covered with poison. In order to kill rats it is necessary for them to take a greater quantity of barium carbonate than arsenic; and when the former is used as the bait the attractive part of the poison package is reduced to nearly half. The greatest fall in the number of rats caught per 100 traps occurred after the use of arsenic. Arsenic is more dangerous to the general population

than barium carbonate, and it is believed that the latter should be used the first time at least when poison is placed in a city in order that the people may become familiar with the poison packages before the stronger arsenic is employed.

Several essential oils, including oil of peppermint, oil of cinnamon, oil of cloves, and oil of anise were experimented with for scenting the poison packages, but all were discarded as useless except the last named. Oil of anise seems to have a certain attractive power for rats but not for other animals.

During the seven months that poison was being continuously placed throughout the city of Guayaquil not a single accident occurred among the inhabitants. The only domestic animals killed by poison were a few cats attracted by the use of fish for bait. The exact number of cats killed is not known but was less than 10. In so far as is known not another animal was killed. The remarkable freedom of accidental poisoning of people and domestic animals can be explained only by the form in which poison was used.

The personnel employed in connection with the use of poison varied during the campaign. Two men and 12 to 18 boys were employed in preparing the packages. During the first poisoning there were 7 field inspectors and 21 poisoners; during the second, 6 inspectors and 16 men; and during the remainder of the poisonings 3 inspectors and 14 poisoners.

The cost of using poison will vary with the cost of labor and materials in a community. To cover Guayaquil four times with poison, a city of about 100,000, the following materials were used: 1,030 pounds of barium carbonate; 500 pounds of arsenic; 3,600 pounds of corn meal; 2,300 pounds of flour; and 340 reams of wrapping paper.

The placing of poison depends upon the conditions existing where it is to be used. In Guayaquil, at the beginning of the campaign, plague could be expected to occur in any city block; therefore the whole city had to be treated. The first poisoning began at one side of the city and advanced across it toward the traps which were set on the outskirts of the opposite side to see whether there was a migratory movement of the rats in front of the poison. There was not the least indication that the rats were scattered ahead of the poison. In the following poisonings the general idea was to poison the area in which the traps were located last. Should plague be confined to a small area, this should be surrounded by a broad zone and poison placed from the outside toward the center. This method was employed in Guayaquil during February and March, when the disease appeared to be limited to definite sections of the city.

Efficiency of poison.—One has only to question the rat trappers or talk with the residents of Guayaquil to learn that since the use of

poison in September the number of rats infesting the city has been reduced to an undreamed of degree. Old residents will tell you that there has never been a time when there was so little evidence of these animals. At the time this report is being written (April 1, 1930), the number of traps in use is nearly five times as great as at the same time a year ago, and fewer rats are being caught. The trappers are disgruntled with the zones in which they are stationed, yet they are all in the most rat-infested section of the city. The trappers now receive 10 centavos for each rat they catch and 1 centavo for each mouse, as well as the pay they were receiving a year ago. Out of this money they must provide bait for their traps, and they complain that they were better off when they received no bonus and bait was provided, because they say that they can not catch enough rats to pay for the bait.

In Table 40 a rough idea of the results from the use of poison can be obtained from the tabulation of data furnished by inspectors who visited the houses in which poison had been placed two or three days previously. The inspectors questioned the householders regarding the number of dead rats found by them. These figures in no way represent the actual number of rats killed, but do furnish a good index of the results found at each poisoning. The first poisoning evidently destroyed the greatest number of rats, as the inspectors found, on an average, approximately two rats killed per house, while in the next poisoning only one rat was reported dead to two houses visited. The number of rats killed as determined by this means has gradually fallen until only one dead rat is reported for six houses visited.

During the first and second poisoning it was necessary to detail one man to answer the telephone, because there were so many calls requesting that men be sent to different premises to search for and remove the dead and malodorous rats from inaccessible places about the houses.

TRAPPING IN CONJUNCTION WITH POISON

There is no doubt that the cause of the reduction of rats in Guayaquil during the last seven months was poison and not the few rats trapped. In 1925, 1926, and 1927 the rat catch was greater every month of the year than during the period of this report, yet there was no apparent decrease in the rat population nor phenomenal effect on the number of plague cases. In an active plague campaign the use of traps should not be discarded, but should be maintained to the greatest extent possible, because many rats are destroyed by trapping and the results are the best indication of the reduction that is taking place in the number of rats.

At first there was no definite plan for trapping. It was not until maps had been prepared showing the location of plague cases during the past five years and in 1929 and the endemic area as already described as well as a study of the *cheopis* index that a definite plan for trapping was evolved. The first consideration in formulating the plan of trapping was to include the endemic section or the part of the city in which plague occurs during the months when it reaches its lowest level. Taking a map of the city, a line was drawn around the above section, modifying it to include near-by blocks in which plague had occurred frequently in the last five years and where cases had been notified in 1929, and also to include blocks that showed a high *cheopis* index, blocks near the endemic area. After this area had been mapped out, it was divided into 28 districts for trapping, and a trapper assigned to each district. By thus concentrating the traps and not having them scattered over the entire city, the trappers were able to supplement the poisoning operations in the destruction of rats in the most dangerous area of the city.

The location of plague cases since January 1, 1930, justified the placing of traps in the manner described above and demonstrated that the trapped area would be the most difficult section of the city, from which to eradicate plague. From January 1 until the middle of April only two cases of plague were reported outside the trapped zone. The first of these was reported in the first half of January and was located several blocks outside the dangerous zone. There were no other cases near it during the next three months. The second case was only one block beyond the trapped zone and the zone was modified to include the block in which the infected residence was located. This case was the sixth reported in 1930 and occurred during the first half of March.

The first four cases of plague reported in 1930 occurred in the first half of January and were widely scattered, showing that plague infection was still widely distributed among the rats, but the incidence was not high or there would have been more cases. At the end of March there appeared to be only two infected centers—one that was quite large in the southwest part of the trapped zone and another smaller one in the central part of the city.

The most convincing data regarding the effectiveness of poison as an antiplague measure is that given in Table 41. This table presents two valuable indices showing the reduction that took place in the rat population. The first of these is the number of rats being caught per 100 traps per day, and the other is the percentage of *norvegicus*, *rattus*, and *alexandrinus* being caught.

In the last column of Table 41 are given the figures for the number of rats caught per 100 traps per day. The low figures for the second half of September and first half of October should be disregarded,

because they represent only the rats caught in a narrow zone in the northern outskirts of the city where the traps were concentrated for a month and before poison had been placed there. The first figure, 11.67, really represents the number of rats that could be caught before poison was used, and it is lower than was frequently obtained in former years. The effects of poison first appear in the second half of October, when 5.84 rats per hundred traps per day were caught in the most highly rat-infested section of the city. From this point the rat catch slowly and progressively falls until the low figure of 2.69 is reached during the first half of January. The rainy season began on January 21, and we find that the number of rats caught is markedly increased by the rains, a point already alluded to in the discussion of the etiology. The heavy rains ceased the latter part of February and the rat catch began to fall again, reaching 3.05 at the end of March. During the rainy season of 1929 the number of rats caught per hundred traps per day was over 13 during the months of February and March, or more than double the figures for 1930. In Table 43 is given a comparison of the number of rats caught in the preceding year with those of the months in which poison was used.

One of the most valuable guides that can be followed in a campaign to eradicate rats is that furnished by the percentage of *rattus* and *alexandrinus*, when normally the percentage of *norvegicus* greatly exceeds the other species in a community. It can be stated as a fact that, when the *rattus* group of rats exceeds the *norvegicus* under the above conditions, the rat population has been reduced to such a degree that plague will probably disappear or, at least, the backbone of the disease has been broken. If we follow the figures given in Table 41 we find, beginning with the second half of October, that only 16 per cent of the rat catch are *rattus* and *alexandrinus*. Following the table downward we see the percentage of these rats increasing until it reaches 44.5 per cent in the second half of March. Figures for the first half of April, which are not included in the table, were 55 per cent *rattus* and *alexandrinus*, or the *norvegicus* catch the second week in April was 5 per cent less than that of the *rattus* group. This condition had never been attained before in Guayaquil during the 22 years that war has been waged on rats.

In observing the figures in Table 41 it must be kept in mind that the number of traps employed has been increased at irregular intervals since September 1, or the impression is likely to be gained that more rats were being caught per trap in March than in October, particularly in the *rattus* group. In reality the number of these rats caught per 100 snap traps in use was three the second half of October, when they formed only 16 per cent of the rat catch, and only 1.5 the last half of March, when they constituted 44.5 per cent.

What has been the actual reduction in the rat population of Guayaquil among the rats living in and invading buildings? Rats that do not live inside or invade buildings can not be affected much by the antiplague measures employed; but it has been shown that these rats are not a great factor in the eradication of plague. This is a question rather difficult to determine; but basing our computation on the results of trapping and the percentage of the different species being caught, it is believed that it can be stated conservatively that the *norvegicus* has been reduced about 75 per cent and the other species about 50 per cent. In order to eradicate plague from Guayaquil at the present time, it is not believed to be necessary to reduce the rat population much below the point arrived at, because a large number of the rats here are now immune to the disease, and rats that harbor outside are not infested with a sufficient number of *cheopis* to transmit the disease; therefore all that is required is that the indoor rats be reduced to a point that the nonimmune rats are separated so widely that plague can not be transmitted from one to the other.

EFFECTS OF ANTIPLAGUE MEASURES ON THE NUMBER OF PLAGUE-INFECTED RATS

The number of individual plague-infected rats detected in the laboratory during this study was so small that no information is available from this source. Only three individual plague-infected rats were discovered, although many were autopsied that had the disease. It should be stated that the detection of plague-infected rats at Guayaquil is a very difficult matter, because typical plague pathology was not found in the rats there. It seems possible that increased tolerance to plague may be responsible for this finding. On the other hand, rats with enlarged spleens and livers were more common than those with normal organs. The reason only three individual rats were detected is not because all suspicious rats were not subjected to microscropical examination, and in many instances to guinea pig inoculation, but because of negative results.

The best index to the number of plague-infected rats is that furnished by the results of mass inoculation of an immulsion formed with small pieces of spleens taken from all the rats in the day's catch. Table 42 gives the results of this procedure. The guinea-pig deaths reported in this table were all proved to be due to plague by autopsy. It will be seen that the average number of rats per guinea pig dying of plague was highest in November, when only 256 rats were autopsied per dead guinea pig. The figure for December was little changed; but in the following months, corresponding to the fall in human cases, the number of rats per dead guinea pig advanced rapidly, reaching practically 3,000 in March. In former years, as shown by

the occurrence of human cases, the number of plague-infected rats should have been much greater in January and February than in October, November, and December. The conclusion seems clear that the use of poison is responsible for the marked reduction this year (1930) in the number of plague-infected rats in January, February, and March.

EFFECTS OF ANTIPLAGUE MEASURES ON THE INCIDENCE OF HUMAN PLAGUE

If we base the prediction of the number of cases of plague that would ordinarily have occurred in January, February, and March, 1930, upon the past history of epidemics in Guayaquil it can be conservatively estimated that there should have been a great many cases in these three months, probably more than in the same months of 1929, when there were 94 cases. In the past, whenever there has been a year with less than 100 cases, as in 1928, there was a marked rise in the following year and a still greater number of cases in the next year, or as there should have been in 1930. Ever since 1916 there have been more cases in the months of January, February, and March than in the preceding months of October, November, and December, with one exception in the year of 1928.

There were 42 cases of plague in the last three months of 1929 and should have been many more than this figure in the first three months of 1930; yet there were only nine cases, or a reduction incomparable with the history of plague in Guayaquil at any previous time and which can be explained only by the successful use of poison. Many other comparisons and predications can be made from the past history, but all result in the same conclusion that some external agency caused the marked fall in plague this year, when there were only 4 cases in January, 2 in February, and 3 in March, or a total of 9 cases during the period when plague reaches its highest point in the yearly epidemic. There were no cases reported in April.

It is believed, with reason, that if the measures used during the last seven months are continued throughout the year, plague will disappear entirely from Guayaquil. However, time will be necessary to prove or disprove this prediction. If plague is eradicated from Guayaquil, it will voluntarily disappear at all other points in central Ecuador, as stated before, under the discussion of epidemiology.

It should be stated that in November and December, 1929, plague was present at the lowland towns of Duran, Milagro, Daule, and Nobol, and that poison without trapping was used in all of them except Duran, with the result that the last case of plague was reported in them as follows: Daule, December; Nobol, January 9; Duran, January 12; and Milagro, January 16. Plague ended in all of these places before the onset of the rainy season, which was unusual, and to be explained only by the steps taken to destroy rats, namely poison.

SUMMARY

(1) The use of poison in the form of paper packages is an inexpensive, safe, simple, and effective procedure to employ in any antiplague campaign.

(2) Poison reduced the incidence of plague and the rat population in a community in which rat harborage and rat infestation were both as great as can probably be found in any other place.

(3) Both plague and rats were markedly reduced without measures of ratproofing.

(4) It can be conservatively estimated that plague was reduced 80 per cent during the months of January, February, and March, 1930, by the measures outlined in this report.

(5) The results obtained in this antiplague campaign were due to the continued use of poison, and the trapping of rats was only a minor accessory factor, but it should not be discarded in any fight against plague.

(6) The use of poison, as shown by the results of trapping, reduced the number of rats caught from over 11 per 100 traps per day in September to 3.05 in March.

(7) The use of poison reduced the percentage of *norvegicus* found in buildings from 84 per cent in October to 45 per cent in the second week in April.

(8) When the percentage of *rattus* and *alexandrinus* exceeds that of *norvegicus* in a community in which the latter species normally predominates, the antiplague campaign is being waged successfully.

(9) *R. norvegicus* has been reduced about 75 per cent and *rattus* and *alexandrinus* about 50 per cent, or the total rat population found in buildings about two-thirds, by the simple antiplague measures in use during the past seven months in Guayaquil.

(10) Plague-infected rats in Guayaquil were reduced from one per 256 caught in November to one per 2,976 in March by the simple methods outlined in this report.

(11) If as active a campaign is maintained in Guayaquil during the next year as in the past seven months plague will probably be eradicated.

(12) When plague disappears from Guayaquil it will also vanish from all other parts of central Ecuador.

(13) The adoption of measures to bring about ratproofing of buildings, especially the large markets and the places where grains as well as other rat foods are stored, would simplify the eradication of plague from Guayaquil and tend to prevent a reoccurrence of the disease.

(14) A modern system for the collection of garbage would assist in reducing the rat population of Guayaquil.

(Tables 1–43 follow)

TABLE 1.—*Cases of plague reported monthly since February, 1908, when the disease first appeared in Guayaquil*

Month	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
January		42	77	85	48	73	56	75	187	105	111	23
February	63	61	48	37	23	61	16	40	151	63	69	21
March	225	63	27	21	12	24	7	15	81	33	37	13
April	175	75	18	5	7	7	3		30	10	24	4
May	66	57	5	7	5	10	5	2	5	3	9	5
June	13	39	6	3		5	5		11	2	4	6
July	9	23	11	16		14	2	5	12	3	2	3
August	9	38	27	19	21	23	8		15	3		
September	6	85	95	37	40	46	15	3	22	5	2	
October	3	123	170	92	78	113	45	9	45	20	9	
November	5	168	105	102	135	107	112	47	88	44	6	2
December	19	130	90	91	124	159	139	133	198	85	14	4
Total	593	904	679	515	493	732	413	329	845	376	287	81

Month	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
January	7	94	20	5	49	16	37	17	4	18	4
February	23	82	12	14	40	33	15	39	5	50	2
March	15	38	13	15	16	14	12	22	6	26	3
April		13	2	2	8	8	3	8		8	0
May		9	2	2	6	1	5	5	2	3	
June		2			5	1	2		5		
July		2		4	2		5	5		1	
August	5	3			3		7	7		6	
September	6	7		8	4	5	4	3	3	7	
October	5	7	5	6	4	11	3	4	3	10	
November	37	12	3	7	7	10	12	9	10	14	
December	94	8	15	42	5	18	14	5	16	18	
Total	192	277	72	105	149	117	119	124	54	161	9

TABLE 2.—*Relationship of plague in Guayaquil to its appearance in the lowland railroad towns and in the mountain towns and haciendas*

Year	Number of cases											
	Port	Lowland railroad towns				Mountain railroad towns			Mountain caserios and haciendas			
	Guayaquil	Duran	Yaguachi	Milagro	Naranjito	Huigra	Alausi	Ambato	Near Alausi	Near Guamote	Pungala	Near Latacunga
1908	593											
1909	904		4	} 23		P						
1910	679					P						
1911	515											
1912	493	7		8								
1913	732	10	6	13	1	12	9		P			
1914	413	10	1	1								
1915	329											
1916	845						167	42				
1917	376					P	20					
1918	287	5								P		
1919	81	2						8				
1920	192	4										
1921	277	3		1								
1922	72											
1923	105			1				8		41		
1924	149	3										
1925	117	6	2	1								
1926	119	4					P	101	P	15		53
1927	124										P	
1928	54	9										
1929	161	18		7		3	22	8	20	13	10	

TABLE 3.—*Plague in Guayaquil during the past five years, 1925 to 1929, inclusive, showing mortality*

Month	Per cent mortality					Total
	1925	1926	1927	1928	1929	
January	43.7	37.8	35.2	100	55.5	44.5
February	39.3	46.6	17.9	60	38	34.5
March	57.1	50	40.9	16.6	26.9	38.7
April	50	66.6	25		12.5	33.3
May	100		40	50	33.3	31.2
June	100			40		37.5
July		40	20			27.2
August		14.2			16.6	10
September	40		33.3		42.5	27.2
October	45.4		75	66.6	40	45.1
November	60	25	33.3	40	35.7	38.1
December	33.3	35.7	40	43.7	44.4	39.4
Total	45.2	33.6	29.0	44.4	36.6	36.8

TABLE 4.—*Average mean temperatures of Guayaquil during the three years 1927, 1928, and 1929, and other climatic conditions*

Month	Mean temperatures			Rainfall and sky conditions	Humidity
	High	Low	Mean		
	°F.	°F.	°F.		
January	84.5	74.5	79.6	Much	High.
February	84.1	74.9	79.5	do	Very high.
March	84.7	75.6	80.1	do	Do.
April	84.7	75.6	80.1	do	Do.
May	83.3	74.1	78.7	Very slight, if any	Moderate.
June	80.1	71.7	75.9	None; cloudy	Do.
July	79.9	71	75.4	do	Do.
August	81	70.9	76.2	do	Do.
September	81.9	71.4	76.6	do	Do.
October	83.1	71	77.2	do	Do.
November	82	71.6	76.8	do	Do.
December	85.1	73.6	79.3	Slight, if any	Moderate and high.

TABLE 5.—*Monthly average mean temperatures and rainfall of Ambato and Quito for the past 14 years and the humidity for three months of 1929*

Month	Ambato					Quito				
	Mean high	Mean low	Mean temperature	Rain	Relative humidity	Mean high	Mean low	Mean tmperature	Rain	Relative humidity
	°F.	°F.	°F.	Inches		°F.	°F.	°F.	Inches	
January	72.1	48.4	58.4	1.37		67.6	46.6	55.2	5.11	
February	71.5	48.8	58	1.85		68.2	46.8	55.2	5.03	
March	71	49.2	57.8	2.12		67.6	47.4	55.2	6.22	
April	70.5	48.8	57.8	2.36		67.8	47.4	55.2	6.81	
May	70.2	48.6	57.4	1.97		67	46.8	55.4	5.19	
June	68.2	46.4	55.8	.98		69	45.2	55.4	1.65	
July	66.4	46.2	54.8	.70	77	69.7	44.4	54.6	.70	56
August	67.4	45.6	55	.78	76	70.8	44.2	55.4	.86	63
September	69.6	45.8	55.8	1.37	75	71	45	55.6	3.26	69
October	72.4	46.6	57.4	1.57		69.4	45.8	55	5.19	
November	73.6	47.4	58.8	2.08		69.2	45.8	55	4.64	
December	72.8	48	58.6	1.45		69	46.2	55.2	4.40	

Table 6.—*Species of rats caught at Ambato and Latacunga in the Sierras*

Month	Ambato (altitude 8,440 feet)						Latacunga (altitude 9,020 feet)			
	Number			Per cent			Number		Per cent	
	Norvegicus	Alexandrinus	Rattus	Norvegicus	Alexandrinus	Rattus	Norvegicus	Alexandrinus and rattus	Norvegicus	Alexandrinus and rattus
January								136		100
February							46	849	5.1	94.9
March	113	120	71	37.1	39.4	23.3	33	665	4.9	95.1
April	158	141	113	38.3	34.2	27.4	24	813	2.9	97.1
May	181	228	203	29.5	37.2	33.1	54	866	6.2	93.8
June	158	167	160	32.5	34.4	32.9		542		100
July	151	173	147	32	36.8	31.2	83	513	16.1	83.9
August	79	131	147	22.1	36.7	41.1	72	375	19.2	80.8
September	43	118	116	15.5	42.5	41.8	62	489	14.9	85.1
October	55	101	124	19.6	36	44.2	15	355	4.2	95.8
November	44	125	123	15	42.8	42.1	36	539	6.6	93.4
December	34	74	66	19.5	42.5	37.9				
Total	1,016	1,378	1,270	27.7	37.6	34.6	425	6,142	6.4	93.5

Table 7.—*Flea infestation of rats in the mountain towns of Ecuador where cheopis has been found*

Month	Ambato (altitude 8,440 feet)				Alausi (altitude 8,550 feet)				Latacunga (altitude 9,020 feet)				Quito (altitude 9,350 feet)			
	Number of rats	X. cheopis	Leptopsylla	Ceratophyllus londinensis	Number of rats	X. cheopis	Leptopsylla	Ceratophyllus londinensis	Number of rats	X. cheopis	Leptopsylla	Ceratophyllus londinensis	Number of rats	X. cheopis	Leptopsylla	Ceratophyllus londinensis
January	7	42		14	5	6	2		10	13		8	33	3	77	30
February	16	45		1	4	3	3		43	2	67	50	50	18	293	20
March	30	87		51	13	11	26	3	88	17	11	31	43		175	4
April	5	40		2					45	37	6	13	38		141	40
May	8	66		21					5	14	1	1	45		324	12
June	11	97	2	6					13	18		8	38	6	134	1
July	9	25		10					20	143			53	6	197	22
August	15	1		33	3				15			26	31	13	99	51
September	7	11		32	10	3			2			26	35	52	21	7
October	3	1		2	5		3	2	14		8		14	19	90	3
November					3		3	1					2			7
December	5	14			6		14		4	8		1	21	7	51	
Total	116	429	2	172	49	43	51	6	259	249	93	164	403	124	1,602	197
Total index		3.69	0.01	1.48		0.87	1.04	0.12		0.96	0.35	0.63		0.3	3.97	0.48

Table 8.—*Flea infestation of rats in the mountain towns of Ecuador where X. cheopis has never been found*

Month	Riobamba (altitude, 9,020 feet.)			Guaytacama (altitude, 9,500 feet.)			Guamote (altitude, 9,990 feet.)		
	Number of rats	Leptopsylla	Cerato londinensis	Number of rats	Leptopsylla	Cerato londinensis	Number of rats	Leptopsylla	Cerato londinensis
January							50	38	14
February	1		10	14	10	1	22	14	
March				10	11				
April	4		8	31	33				
May				4					
June				14	12		16	38	3
July									
August	2		2	6			5	2	1
September									
October	5			11	52	1			
November	12								
December	10						5	3	2
Total	34		20	90	118	2	98	95	20
Total index			0.58		1.31	0.02		0.96	0.2

TABLE 9.—*Flea infestation of mice in mountain towns of Ecuador*

Month	Ambato (altitude, 8,440 feet)				Alausi (altitude, 8,550 feet)				Quito (altitude, 9,350 feet)				Guamote (altitude, 9,990 feet)			
	Number of Mus musculus	X. cheopis	Leptopsylla	Ceratophyllus londinensis	Number of Mus musculus	X. cheopis	Leptopsylla	Ceratophyllus londinensis	Number of Mus musculus	X. cheopis	Leptopsylla	Ceratophyllus londinensis	Number of Mus musculus	X. cheopis	Leptopsylla	Ceratophyllus londinensis
January	8	1	----	84	371	12	112	73	20	----	----	----	547	----	2,366	85
February	8	3	1	104	223	4	109	16	26	----	17	3	180	----	841	40
March	196	4	5	41	49	1	61	5	23	----	13	1	114	----	356	10
April	26	2	2	72	----	----	----	----	19	----	22	----	282	----	1,127	69
May	81	4	25	61	145	1	85	32	12	----	6	1	59	----	221	19
June	42	3	8	44	----	----	----	----	8	----	----	----	186	----	1,181	38
July	56	2	1	65	----	----	----	----	1	----	----	----	64	----	401	----
August	10	----	----	7	----	----	----	----	----	----	----	----	45	----	201	4
September	23	----	5	86	144	32	324	27	5	----	----	----	44	----	142	7
October	50	4	5	128	271	7	352	41	5	----	----	----	233	----	848	41
November	5	6	----	42	154	3	173	13	----	----	----	----	----	----	----	----
December	55	15	1	70	17	----	11	3	1	----	----	----	104	----	586	25

TABLE 10.—*Comparison of the mean temperatures and cheopis*[1] *indices of Guayaquil, Ambato, and Quito*

Month	Average mean temperatures			Number of rats and cheopis index					
				Guayaquil		Ambato		Quito	
	Guayaquil	Ambato	Quito	Number of rats	Cheopis index	Number of rats	Cheopis index	Number of rats	Cheopis index
	°F	°F	°F						
October	77.2	57.4	55	--------	--------	3	0.33	14	1.35
November	76.8	58.8	55	972	8.00	--------	--------	2	0
December	79.3	58.6	55.2	558	7.59	5	2.80	21	.33
January	79.6	58.4	55.2	681	4.73	7	6.00	33	.09
February	79.5	58	55.2	872	7.02	16	2.81	50	.36
March	80.1	57.8	55.2	665	5.97	30	2.56	43	0
April	80.1	57.8	55.2	--------	--------	5	8.00	38	0
May	78.7	57.4	55.4	--------	--------	8	8.50	45	0
June	75.9	55.8	55.4	--------	--------	11	8.81	38	.15
July	75.4	54.8	54.6	--------	--------	9	2.77	53	.11
August	76.2	55	55.4	--------	--------	15	.66	31	.41
September	76.6	55.8	55.6	--------	--------	5	2.80	35	1.48

[1] The cheopis index given here for Ambato is too high and is listed only to show the presence of cheopis during the different months.

TABLE 11.—*Monthly cheopis index of Guayaquil during the season when plague is most prevalent*

Month	Number of rats	Number of cheopis			Cheopis index		
		Males	Females	Total	Males	Females	Total
November	[1] 972	4,247	3,533	7,780	4.36	3.63	8.00
December	558	2,528	1,711	4,239	4.53	3.06	7.59
January	681	1,869	1,353	3,222	2.74	1.98	4.73
February	872	3,042	3,087	6,129	3.48	3.54	7.02
March	665	2,229	1,744	3,973	3.35	2.62	5.97
Total	3,748	13,915	11,428	25,343	3.71	3.04	6.76

[1] These figures include 169 rats caught during the last 4 days in October.

TABLE 12.—*Cheopis index of Norway adult rats in Guayaquil*

Month	Female adults					Male adults					Total adults, Cheopis index		
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index					
			Male	Female	Total			Male	Female	Total	Male	Female	Total
November	112	413	3.68	3.27	6.96	54	488	4.41	4.62	9.03	3.92	3.71	7.63
December	71	425	3.76	2.22	5.98	39	279	3.76	3.38	7.14	3.76	2.63	6.40
January	83	374	2.57	1.92	4.50	55	245	2.74	1.70	4.45	2.64	1.84	4.48
February	109	765	3.22	3.79	7.01	57	343	2.96	3.05	6.01	3.13	3.54	6.67
March	96	384	2.33	1.66	4.00	47	169	1.76	1.82	3.59	2.14	1.72	3.86
Total	471	2,728	3.12	2.67	5.79	252	1,524	3.12	2.92	6.04	3.12	2.75	5.88

TABLE 13.—*Cheopis index of Norway rats one-half to two-thirds grown*

Month	Young females					Young males					Total young, Cheopis index		
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index					
			Male	Female	Total			Male	Female	Total	Male	Female	Total
November	87	878	6.03	4.05	10.09	81	834	5.97	4.32	10.29	6.00	4.18	10.19
December	53	379	4.50	2.64	7.15	41	314	4.56	3.09	7.65	4.53	2.84	7.37
January	77	506	4.22	2.35	6.57	50	248	2.88	2.08	4.96	3.69	2.24	5.93
February	68	515	3.80	3.76	7.57	57	483	4.31	4.15	8.47	4.04	3.94	7.98
March	76	328	2.48	1.82	4.30	42	324	4.16	3.54	7.71	3.08	2.44	5.52
Total	361	2,606	4.25	2.96	7.21	271	2,203	4.56	3.56	8.12	4.38	3.22	7.60

TABLE 14.—*Cheopis index of Norway rats less than one-half grown and total Norway rats in Guayaquil*

Month	Less than one-half grown					Total Norway rats				
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index		
			Male	Female	Total			Male	Female	Total
November	363	2,657	3.89	3.42	7.31	697	5,637	4.41	3.67	8.08
December	271	2,121	4.71	3.11	7.82	475	3,518	4.45	2.94	7.40
January	355	1,590	2.52	1.95	4.47	620	2,963	2.78	1.99	4.77
February	469	3,238	3.51	3.39	6.90	760	5,344	3.51	3.51	7.02
March	325	2,024	3.54	2.68	6.22	586	3,229	3.11	2.39	5.51
Total	1,783	11,630	3.58	2.94	6.52	3,138	20,691	3.63	2.95	6.58

TABLE 15.—*Comparison of the cheopis index for the three classes of Norway rats*

Month	Cheopis index								
	Adults			One-half to two-thirds grown			Less than one-half grown		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
November	3.92	3.71	7.63	6.00	4.18	10.19	3.89	3.42	7.31
December	3.76	2.63	6.40	4.53	2.84	7.37	4.71	3.11	7.82
January	2.64	1.84	4.48	3.69	2.24	5.93	2.52	1.95	4.47
February	3.13	3.54	6.67	4.04	3.94	7.98	3.51	3.39	6.90
March	2.14	1.72	3.86	3.08	2.44	5.52	3.54	2.68	6.22
Total	3.12	2.75	5.88	4.38	3.22	7.60	3.58	2.94	6.52

TABLE 16.—*Cheopis index of alexandrinus and rattus adults in Guayaquil*

Month	Female adults					Male adults					Total adults		
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index			Cheopis index		
			Male	Female	Total			Male	Female	Total	Male	Female	Total
November	13	60	2.30	2.30	4.61	17	149	4.58	4.17	8.76	3.60	3.36	6.96
December	10	82	4.30	3.40	8.20	5	55	6.00	5.00	11.00	4.86	4.26	9.13
January	6	26	2.00	2.33	4.33	13	78	2.84	3.15	6.00	2.57	2.89	5.47
February	9	81	4.55	4.44	9.00	13	114	4.38	4.38	8.76	4.45	4.40	8.86
March	14	159	6.14	5.21	11.35	8	80	5.12	4.87	8.00	5.77	5.09	10.87
Total	52	408	4.07	3.76	7.84	56	476	4.33	4.16	8.50	4.21	3.97	8.18

TABLE 17.—*Cheopis index of young alexandrinus and rattus, one-half to two-thirds grown in Guayaquil*

Month	Young females					Young males					Total young		
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index			Cheopis index		
			Male	Female	Total			Male	Female	Total	Male	Female	Total
November	19	230	5.78	6.31	12.10	19	164	4.52	4.10	8.63	5.15	5.21	10.36
December	11	42	2.00	1.81	3.81	13	86	4.07	2.53	6.61	3.12	2.20	5.33
January	7	36	2.00	3.14	5.14	10	53	3.80	1.50	5.30	3.05	2.17	5.23
February	23	133	3.04	2.73	5.78	22	148	2.86	3.86	6.72	2.95	3.28	6.24
March	13	92	3.38	3.69	7.07	15	178	6.60	5.26	11.86	5.10	4.53	9.64
Total	73	533	3.56	3.74	7.30	79	629	4.29	3.67	7.96	3.94	3.70	7.64

TABLE 18.—*Cheopis index of young alexandrinus and rattus less than one-half grown, and total index of these rats in Guayaquil*

Month	Alexandrinus and rattus less than one-half grown					Total alexandrinus and rattus				
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index		
			Male	Female	Total			Male	Female	Total
November	38	299	3.97	3.89	7.86	103	902	4.29	4.21	8.50
December	29	318	6.37	4.58	10.96	68	583	4.89	3.67	8.57
January	25	66	1.56	1.08	2.64	61	259	2.29	1.95	4.24
February	45	309	3.08	3.77	6.86	112	785	3.30	3.70	7.00
March	29	235	4.68	3.41	8.10	79	744	5.13	4.27	9.41
Total	166	1,227	3.91	3.47	7.38	426	3,273	4.00	3.68	7.68

Table 19.—*Comparison of the cheopis index of the three classes of alexandrinus and rattus in Guayaquil*

Month	Cheopis index								
	Adults			One-half to two-thirds grown			Less than one-half grown		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
November	3.60	3.36	6.96	5.15	5.21	10.36	3.97	3.89	7.86
December	4.86	4.26	9.13	3.12	2.20	5.33	6.37	4.58	10.96
January	2.57	2.89	5.47	3.05	2.17	5.23	1.56	1.08	2.64
February	4.45	4.40	8.86	2.95	3.28	6.24	3.08	3.77	6.86
March	5.77	5.09	10.87	5.10	4.53	9.64	4.68	3.41	8.10
Total	4.21	3.97	8.18	3.94	3.70	7.64	3.91	3.47	7.38

Table 20.—*Comparison of the alexandrinus and rattus cheopis index in Guayaquil*

Month	Total rattus					Total Alexandrinus				
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index		
			Male	Female	Total			Male	Female	Total
November	67	609	4.62	4.46	9.08	39	293	3.71	3.79	7.51
December	44	358	4.70	3.43	8.13	24	225	5.25	4.12	9.37
January	49	213	2.42	1.91	4.34	12	46	1.75	2.08	3.83
February	72	586	3.80	4.33	8.13	40	199	2.40	2.57	4.97
March	43	392	5.11	4.00	9.11	36	352	5.16	4.61	9.77
Total	275	2,158	4.10	3.73	7.84	151	1,115	3.80	3.58	7.38

Table 21.—*Comparison of the norvegicus, rattus, and alexandrinus cheopis index in Guayaquil*

Month	Total rattus and Alexandrinus					Total Norway				
	Number of rats	Number of fleas	Cheopis index			Number of rats	Number of fleas	Cheopis index		
			Male	Female	Total			Male	Female	Total
November	106	902	4.29	4.21	8.50	697	5,637	4.41	3.66	8.08
December	68	583	4.89	3.67	8.57	475	3,518	4.45	2.94	7.40
January	61	259	2.29	1.95	4.24	620	2,963	2.78	1.99	4.77
February	112	785	3.30	3.70	7.00	760	5,344	3.51	3.51	7.02
March	79	744	5.13	4.27	9.41	586	3,229	3.11	2.39	5.51
Total	426	3,273	4.00	3.68	7.68	3,138	20,691	3.63	2.95	6.58

Table 22.—*Analysis of the cheopis infestation of rats less than one-half grown during the months of November and December in Guayaquil*

Age	Rattus and alexandrinus			Norvegicus		
	Number of rats	Number of fleas	Cheopis index	Number of rats	Number of fleas	Cheopis index
Rats one-fourth to one-half grown	45	341	7.57	358	2,218	6.09
Rats one-sixth to one-fourth grown	12	90	7.33	164	1,212	7.39
Rats one-sixth or less	29	306	10.55	181	1,729	9.55
Total	86	737	8.56	703	5,159	7.33

TABLE 23.—*Flea index of rats caught in different establishments in Guayaquil*

Establishments	November	December	January	February	March	Total
Houses	8.52	8.59	4.76	5.43	5.02	6.34
Hotels	8.75	5.33	2.33	6.57	0.50	7.18
Hospitals and barracks	9.62	0.25		18.85	13.50	14.05
Grocery stores and grain stores	9.39	6.20	3.34	7.66	3.59	6.37
Meat shops	10.85	17.00	5.53	9.50	9.75	14.92
Bakeries	6.37	2.00	7.16	2.25	8.42	5.68
Fruit shops	3.75	3.00	1.71	8.44	1.66	3.71
Saloons	1.80	12.00	6.34	8.82	7.00	6.63
Clothing stores	9.54	14.33	4.33	5.22	8.58	8.36
Shoe shops	10.88	4.00	9.76	5.76	3.53	7.50
Tailer shops	10.75	11.25	2.83	10.88	6.00	8.40
Printing shops	1.60		34.33	10.33	125.00	20.90
Cigar factories	9.97	12.40	6.00			9.90
Jewelry and hardware stores	5.66	5.50	11.14	17.37		10.73
Wharves	0.50		0.25			0.47
Lumber and coal yards	0.00	0.40	1.60		0.50	0.50
Carpenter shops	10 84	3.00		11.72	0.72	8.44
Machine shops		2.23	3.33	4.82	4.16	3.80
Ice factory	1.50		0.80	8.25	10.42	5.41
Coffee, cacao, and sugar warehouses					9.00	9.00

TABLE 24.—*Cheopis index in the business section of Guayaquil where grains and foods are sold; an area of 15 blocks*

Month	Number of rats	Number of cheopis	Cheopis index
November and December	206	2,224	10.79
January	74	505	6.82
February	142	1,939	13.63
March	81	481	5.93
Total	503	5,149	10.23

TABLE 25.—*Cheopis index of the better general business section of Guayaquil, also better residence section—an area of 32 blocks*

Month	Number of rats	Number of cheopis	Cheopis index
November and December	303	2,519	8.31
January	105	605	5.76
February	171	1,223	7.15
March	84	521	6.20
Total	663	4,868	7.33

TABLE 26.—*Cheopis index of 85 scattered blocks in Guayaquil composed chiefly of bamboo shacks*

Month	Number of rats	Number of cheopis	Cheopis index
November and December	165	1,041	6.30
January	90	363	4.03
February	92	366	3.97
March	58	219	3.75
Total	405	1,989	4.89

TABLE 27.—*Relative effect of the cheopis index of rats caught in dwelling houses on the total index*

Month	Total number of rats caught	Number of rats caught in dwelling houses	Per cent of rats caught in houses	Total number of fleas recovered	Number of fleas recovered from houses	Per cent of fleas from houses	Total cheopis index	Cheopis index for houses
November	803	348	43	6,539	2,965	45	8.14	8.52
December	558	318	57	4,239	2,733	64	7.59	8.59
January	681	361	53	3,222	1,719	53	4.73	4.76
February	872	461	53	6,129	2,506	41	7.02	5.43
March	662	369	56	3,973	1,854	47	5.97	5.02
Total	3,746	1,857	50	25,343	11,777	47	6.76	6.34

TABLE 28.—*Percentage of norvegicus caught above the ground floor and on the ground floor of houses and in bamboo shacks, with their cheopis index*

Month	Rats caught on upper floors of houses			Rats caught on ground floor and patios of houses			Rats caught in bamboo shacks		
	Number of norvegicus	Per cent of norvegicus	Cheopis index	Number of norvegicus	Per cent of norvegicus	Cheopis index	Number of norvegicus	Per cent of norvegicus	Cheopis index
January	94	29	7.81	116	36	4.01	113	35	2.69
February	111	29	7.73	156	40	4.76	118	31	3.61
March	63	20	9.76	127	39	3.60	134	41	3.37
Total	268	26	8.24	399	39	4.18	365	35	3.23

TABLE 29.—*Comparison of the cheopis index of norvegicus with that of rattus and alexandrinus caught in dwelling houses*

Month	Rats caught above the ground floor of houses				Rats caught on the ground floor and in patios				Rats caught in bamboo shacks			
	Number of norvegicus	Number of rattus and alexandrinus	Cheopis index: Norvegicus	Cheopis index: Rattus and alexandrinus	Number of norvegicus	Number of rattus and alexandrinus	Cheopis index: Norvegicus	Cheopis index: Rattus and alexandrinus	Number of norvegicus	Number of rattus and alexandrinus	Cheopis index: Norvegicus	Cheopis index: Rattus and alexandrinus
January	94	17	7.81	8.05	116	10	4.01	3.20	113	11	2.69	1.27
February	111	39	7.73	6.20	156	21	4.76	6.37	118	26	3.61	4.65
March	63	12	9.76	26.50	127	16	3.60	6.25	134	17	3.37	4.23
Total	268	68	8.24	10.25	399	47	4.18	5.72	365	54	3.51	3.85

TABLE 30.—*Cheopis index of norvegicus caught in dwelling houses*

Month	Rats caught above the ground floor of houses: Cheopis index			Rats caught on the ground floor and in patios: Cheopis index			Rats caught in bamboo shacks: Cheopis index		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
January	4.52	3.29	7.81	2.22	1.79	4.01	1.59	1.09	2.69
February	3.87	3.86	7.73	2.34	2.42	4.76	1.99	1.61	3.61
March	5.74	4.01	9.76	1.89	1.70	3.60	2.01	1.35	3.37

TABLE 31.—*Number and percentage of norvegicus caught in dwellings, together with classification according to degree of cheopis infestation*

Nature of places rats were caught	Month	Rats without cheopis		Rats with only 1 cheopis		Rats with 2 to 4 cheopis		Total rats with 0-4 cheopis			Rats with 5 or more cheopis	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Index	Number	Per cent
Above ground floor of dwellings	January	14	15	12	13	19	20	45	48	1.46	49	52
	February	15	14	11	10	20	18	46	42	1.45	65	58
	March	9	14	6	10	10	16	25	40	1.48	38	60
Ground floor or patio of dwellings	January	30	26	12	10	42	36	84	72	1.67	32	28
	February	35	22	23	15	43	28	101	65	1.41	55	35
	March	42	33	28	22	25	20	95	75	1.05	32	25
Bamboo shacks	January	23	20	34	30	35	31	92	81	1.44	21	19
	February	41	35	26	22	22	19	89	75	.89	29	25
	March	61	46	22	16	15	11	98	73	.67	36	27

TABLE 32.—*Percentage of rattus and alexandrinus caught in dwellings having none or only 1 cheopis during months of January, February, and March*

Location in which caught	Total number of rattus and alexandrinus caught	Rattus and alexandrinus having 0-1 cheopis	
		Number	Per cent
Above ground floor of dwellings	68	6	8.8
On ground floor or in patios	47	13	27.6
Bamboo shacks	54	22	40.7

TABLE 33.—*Bimonthly climatic conditions and cheopis index*

Bimonthly periods	Cheopis index			Highest temperature	Lowest temperature	Mean high temperature	Mean low temperature	Mean temperature	Approximate humidity	Rain conditions
	Male	Female	Total	°F.	°F.	°F.	°F.	°F.		
Oct. 2	[1] 4.29	3.13	7.42	86	68	83.1	70.8	76.9	Moderate. Not high.	None.
Nov. 1	4.51	3.80	8.32	87	69	84	70.4	77.2	Moderate. Not high.	Do.
Nov. 2	3.79	3.32	7.12	86	70	83.8	70.3	77	Moderate. Not high.	Do.
Dec. 1	4.27	2.56	6.84	(?)					Moderate. Not high.	Do.
Dec. 2	4.90	3.59	8.50	92	71	87.2	72.2	79.7	Moderate. Not high.	Do.
Jan. 1	2.72	2.06	4.78	90	71	87.4	76.8	82.1	Moderate. Not high.	Do.
Jan. 2	2.69	1.88	4.57	90	71	85.2	72.9	79	High	Rain Jan. 21 all night; 5 light rains.
Feb. 1	3.63	3.90	7.53	87	71	84.2	75.8	80	do	Rain every day.
Feb. 2	3.33	3.09	6.42	87	71	84.7	72.9	78.8	do	Rain every day to Feb. 26.
Mar. 1	4.23	3.24	7.47	89	72	85.3	74.5	79.9	do	8 days of light rainfall.
Mar. 2	2.36	1.93	4.30	90	73	86.6	74.8	80.7	do	8 days light, 2 days heavy rain.

[1] Index for the last 4 days in October.

TABLE 34.—*Monthly percentage of cheopis females*

	Monthly cheopis index	Monthly per cent female cheopis
November	8.00	45.4
December	7.59	40.3
January	4.73	41.9
February	7.02	50.3
March	5.97	44.0
Total	6.76	45.0

Table 35.—*Percentage of female cheopis found on norvegicus having different degrees of infestation and caught in different classes of dwellings during the rainy season*

Location in which norvegicus was caught	Month	Norvegicus with 1-4 cheopis: Number of male cheopis	Number of female cheopis	Per cent of female cheopis	Norvegicus with 5-9 cheopis: Number of male cheopis	Number of female cheopis	Per cent of female cheopis	Norvegicus with 10 or more cheopis: Number of male cheopis	Number of female cheopis	Per cent of female cheopis
Above ground floor of dwellings	January	30	36	55	85	63	43	310	211	40
	February	32	35	52	90	89	49.7	308	305	49.7
	March	18	19	51	57	37	39	287	197	41
Ground floor or patio of dwellings	January	81	60	43	63	41	39	114	107	48
	February	59	72	55	112	89	44	195	205	51
	March	49	51	51	54	49	48	138	117	42
Bamboo shacks	January	71	62	47	54	36	40	55	26	32
	February	50	36	42	51	28	35	134	127	49
	March	31	35	53	75	40	35	164	107	39
Total	January	182	158	46	202	140	41	479	344	42
	February	141	143	50.3	253	206	45	637	637	50
	March	98	105	52	186	126	40	589	421	42

Table 36.—*Average number of very young cheopis females found on rats caught in different classes of dwellings*

Location in which rat was caught	Month	Number of rats	Number of young female cheopis	Average number of young females per rat
Above ground floor of dwellings	January	94	75	0.79
	February	111	109	.98
	March	63	36	.57
Total		268	220	.82
Ground floor or patio of dwellings	January	116	40	.34
	February	156	93	.59
	March	127	24	.17
Total		399	157	.39
Bamboo shacks	January	113	32	.28
	February	118	43	.36
	March	134	36	.26
Total		365	111	.30

Table 37.—*Percentage of rats showing different degrees of cheopis infestation*

Month	Number of rats	Cheopis index	No cheopis	1 cheopis	2 to 4 cheopis	5 to 9 cheopis	10 to 19 cheopis	20 to 49 cheopis	50 or more cheopis
			Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
November	972	8.00	16	13	20	22	20	9	0.6
December	558	7.59	16	11	30	16	17	8	2.0
January	681	4.73	21	18	30	17	11	3	0.1
February	872	7.02	20	12	21	22	16	8	1.0
March	665	5.97	27	14	18	17	17	5	0.6

TABLE 38.—*Percentage of cheopis found on rats having different degrees of flea infestation*

Month	Number of cheopis	Cheopis index	1 cheopis	2 to 4 cheopis	5 to 9 cheopis	10 to 19 cheopis	20 to 49 cheopis	50 or more cheopis
			Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
November	7,780	8.00	2	7	19	35	32	5
December	4,239	7.59	1	11	14	30	31	13
January	3,222	4.73	4	19	23	33	20	2
February	6,129	7.02	2	9	19	30	33	8
March	3,973	5.97	2	9	18	38	24	9

TABLE 39.—*Cheopis index of Mus musculus*

Month	Number of mice	Number of fleas	Cheopis index		
			Male	Female	Total
October	1,240	201	0.088	0.073	0.161
November	504	154	.186	.119	.305
December	574	126	.118	.101	.219
January	437	98	.141	.082	.224
February	447	136	.185	.118	.304
March	531	126	.141	.096	.237

TABLE 40.—*The results of each city-wide broadcasting of poison as reported by householders to inspectors*

Number of poison broadcast	Number of houses visited	Number of rats reported found dead	Average number per house visited	Number of poison broadcast	Number of houses visited	Number of rats reported found dead	Average number per house visited
First	545	956	1.75	Fifth	6,272	1,174	0.18
Second	6,129	3,035	.49	Sixth	5,924	1,084	.18
Third	5,612	1,920	.34	Seventh	7,712	1,212	.16
Fourth	5,037	1,140	.22				

TABLE 41.—*Bimonthly number and percentage of rats trapped during the poison campaign and number per 100 traps per day*

Date of beginning and completion of each poison broadcast	Bimonthly period	Number trapped				Percentage				Number of rats per 100 traps per day
		Rattus	Alexandrinus	Total rattus and alexandrinus	Norvegicus	Rattus	Alexandrinus	Total rattus and alexandrinus	Norvegicus	
First began Sept. 23; completed	Sept. 1	342	134	476	1,450	17.7	6.9	24.7	75.2	11.67
Oct. 16	Sept. 2	277	97	374	1,289	16.6	5.8	22.4	77.6	[1] 3.46
Second began Oct. 17; completed	Oct. 1	244	85	329	1,021	18.0	5.6	24.2	75.6	[1] 2.81
Nov. 16	Oct. 2	337	113	450	2,429	11.7	3.9	15.6	84.3	5.84
Third began Nov. 18; completed	Nov. 1	332	114	446	2,231	12.4	4.2	16.6	83.3	5.07
Dec. 14	Nov. 2	516	324	840	2,270	16.5	10.4	27.0	72.9	4.57
Fourth began Dec. 16; completed	Dec. 1	602	296	898	1,736	22.8	11.2	34.0	65.9	4.18
Jan. 9	Dec. 2	415	165	580	1,544	19.5	7.7	27.3	72.6	3.16
Fifth began Jan. 10; completed	Jan. 1	340	97	437	1,237	20.3	5.7	26.1	73.8	2.69
Jan 31	Jan. 2	772	262	1,034	2,391	23.5	7.6	30.1	69.8	4.21
Sixth began Feb. 1; completed Feb. 20	Feb. 1	773	331	1,104	2,421	21.9	9.3	31.3	68.6	4.95
Seventh began Feb. 21; completed	Feb. 2	738	379	1,117	2,605	19.8	10.1	30.0	69.9	5.23
Mar. 19	Mar. 1	864	340	1,204	2,111	26.0	10.2	36.3	63.6	3.68
Eighth began Mar. 20	Mar. 2	935	369	1,304	1,623	31.9	12.6	44.5	55.4	3.05

[1] Traps concentrated for 1 month on the southern outskirts of the city in a small district extending across the city.

TABLE 42.—*Number of guinea pig deaths from daily mass inoculation of rat spleens and human cases of plague during the intensive poison campaign*

Month	Cases of human plague	Number of rat spleens inoculated	Number of guinea pig deaths	Average number of rats per dead guinea pig
October	10	2,486	8	310.7
November	14	4,109	16	256.8
December	18	3,285	12	273.7
January	4	3,570	4	892.5
February	2	4,818	4	1,204.5
March	3	5,953	2	2,976.5

TABLE 43.—*Comparison of the results of trapping during six months when poison was used with the corresponding six months of the following year*

Month	Poison used indifferently				Poison used intensively			
	Total catch of rats and mice	Number of rats	Per cent of rats	Number of rats per 100 traps per day	Total catch of rats and mice	Number of rats	Per cent of rats	Number of rats per 100 traps per day
October	15,170	3,984	26	10.7	11,081	4,229	38	4.3
November	13,737	4,237	31	11.7	13,440	5,787	43	4.8
December	11,617	3,450	30	8.2	10,426	4,758	46	3.6
January	11,153	4,263	38	11.2	12,081	5,099	42	3.5
February	14,423	4,447	31	13.2	16,264	7,247	45	5.1
March	14,562	5,104	35	13.7	15,671	6,242	40	3.3

DEATHS DURING WEEK ENDED AUGUST 23, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended August 23, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of Census, Department of Commerce)

	Week ended Aug. 23, 1930	Corresponding week, 1929
Policies in force	75,743,912	74,612,447
Number of death claims	13,050	11,660
Death claims per 1,000 policies in force, annual rate	9.0	8.1

Deaths[1] from all causes in certain large cities of the United States during the week ended August 23, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Aug. 23, 1930				Corresponding week, 1929		Death rate[2] for first 34 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1930	1929
Total, (78 cities)	6,324	9.5	673	[4] 53	10.3	737	12.3	13.2
Akron	24	4.9	3	27	9.5	16	8.0	9.8
Albany[5]	32	13.1	1	22	13.2	3	15.2	16.7
Atlanta	42	8.2	6	63	13.9	11	16.4	16.6
White	15		1	32		7		
Colored	27	(6)	5	79	(6)	4	(6)	(6)
Baltimore[5]	155	10.1	17	58	12.6	21	14.5	15.4
White	112		13	56		15		
Colored	43	(6)	4	65	(6)	6	(6)	(6)
Birmingham	50	10.0	15	140	13.0	10	14.3	16.9
White	26		8	123		9		
Colored	24	(6)	7	166	(6)	1	(6)	(6)
Boston	169	11.2	20	56	12.4	20	14.5	15.9
Bridgeport	27	9.6	0	0	8.2	2	11.4	12.7
Buffalo	95	8.6	9	40	13.6	14	13.3	14.6
Cambridge	20	9.2	2	37	10.6	4	12.2	13.2
Camden	17	7.6	3	54	13.4	4	14.1	14.9
Canton	18	8.9	3	74	13.5	3	9.5	11.9
Chicago[5]	551	8.5	63	56	9.0	52	10.7	11.8
Cincinnati	110	12.7	8	47	15.7	11	16.0	17.7
Cleveland	177	10.2	27	81	10.3	22	11.4	13.1
Columbus	50	9.0	3	29	12.6	7	16.3	15.5
Dallas	61	12.1	9		8.2	3	12.1	12.2
White	47		7			3		
Colored	14	(6)	2		(6)	0	(6)	(6)
Dayton	38	9.8	2	30	8.7	3	10.6	11.8
Denver	87	15.7	15	156	15.9	4	14.8	15.3
Des Moines	29	10.6	1	17	11.1	1	12.2	12.1
Detroit	227	7.5	35	54	9.9	45	9.7	11.7
Duluth	19	9.8	2	54	8.3	1	11.4	11.8
El Paso	35	17.8	9		15.6	5	18.2	20.9
Erie	28	12.6	3	64	13.6	5	11.6	13.1
Fall River[5, 7]	16	7.3	1	23	11.4	1	12.5	15.0
Flint	25	8.3	9	105	8.6	5	9.5	10.9
Fort Worth	35	11.3	9		7.2	3	11.6	13.1
White	27		7			2		
Colored	8	(6)	2		(6)	1	(6)	(6)
Grand Rapids	18	5.6	2	30	10.7	4	10.6	10.4
Houston	64	11.4	7		9.3	7	12.5	13.1
White	45		6			5		
Colored	19	(6)	1		(6)	2	(6)	(6)
Indianapolis	91	13.0	10	75	13.9	9	15.1	15.2
White	74		8	69		6		
Colored	17	(6)	2	108	(6)	3	(6)	(6)
Jersey City	43	7.1	5	43	9.8	6	11.7	13.1
Kansas City, Kans	34	14.5	0	0	12.9	2	11.4	14.0
White	29		0	0		1		
Colored	5	(6)	0	0	(6)	1	(6)	(6)
Kansas City, Mo	93	12.3	6	47	12.6	12	13.8	14.5
Knoxville	24	11.8	5	117	13.1	2	14.3	14.2
White	19		5	130		2		
Colored	5	(6)	0	0	(6)	0	(6)	(6)
Los Angeles	198	8.3	12	36	9.1	23	11.3	11.7
Louisville	59	10.0	5	43	17.3	10	14.0	15.7
White	43		5	49		6		
Colored	16	(6)	0	0	(6)	4	(6)	(6)
Lowell[7]	29	15.1	5	119	12.9	4	14.1	15.1
Lynn	15	7.6	0	0	9.7	1	11.0	11.8
Memphis	74	15.3	9	107	18.1	6	18.0	19.5
White	37		5	92		3		
Colored	37	(6)	4	135	(6)	3	(6)	(6)

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended August 23, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Aug. 23, 1930				Corresponding week, 1929		Death rate [2] for first 34 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1930	1929
Milwaukee	78	7.1	6	30	7.2	11	10.0	11.4
Minneapolis	57	6.4	3	19	8.8	10	10.8	11.3
Nashville	41	14.5	4	62	19.6	12	17.9	19.8
White	27		3	62		11		
Colored	14	(6)	1	63	(6)	1	(6)	(6)
New Bedford [7]	13	6.0	0	0	8.3	1	11.3	13.2
New Haven	31	9.9	2	39	9.0	1	13.4	13.6
New Orleans	137	15.6	25	145	14.5	15	18.0	18.2
White	80		15	133		9		
Colored	57	(6)	10	168	(6)	6	(6)	(6)
New York	1,071	8.0	108	45	8.4	105	11.2	11.8
Bronx Borough	140	5.7	11	26	6.3	10	8.1	8.6
Brooklyn Borough	378	7.6	47	50	7.4	35	10.1	10.7
Manhattan Borough	404	11.4	41	67	12.0	54	16.8	17.3
Queens Borough	114	5.4	5	145	6.1	4	7.3	7.9
Richmond Borough	35	11.5	4	74	12.2	2	14.8	16.3
Newark, N. J	66	7.7	5	26	10.1	10	12.4	13.4
Oakland	55	10.0	4	48	12.1	6	11.1	11.7
Oklahoma City	38	10.7	6	118	7.4	0	10.9	11.1
Omaha	38	9.2	3	34	12.0	6	14.1	14.2
Paterson	22	8.3	4	70	6.8	1	12.6	13.9
Philadelphia	409	10.9	39	58	9.8	42	12.9	13.7
Pittsburgh	121	9.4	8	29	11.7	29	14.2	15.3
Portland, Oreg	62	10.8	3	37	12.1	3	12.7	13.2
Providence	36	7.5	3	28	10.0	2	13.6	15.2
Richmond	43	12.2	2	30	10.3	2	15.4	17.0
White	25		1	22		1		
Colored	18	(6)	1	44	(6)	1	(6)	(6)
Rochester	65	10.4	8	71	11.3	6	11.9	13.0
St. Louis	168	10.6	21	68	13.8	27	14.8	15.4
St. Paul	37	7.1	2	20	7.4	3	10.3	10.9
Salt Lake City [5]	29	10.8	2	31	9.8	3	12.8	13.5
San Antonio	73	14.8	11		14.1	16	16.0	15.4
San Diego	35	12.2	1	21	11.3	4	14.5	15.8
San Francisco	145	12.0	4	27	10.0	6	13.4	13.5
Schenectady	19	10.3	2	62	4.9	0	11.5	12.8
Seattle	87	12.5	3	30	8.4	3	11.2	11.3
Somerville	16	8.0	1	33	7.6	0	10.1	9.6
Spokane	19	8.6	1	26	8.6	1	12.5	13.3
Springfield, Mass	26	9.0	4	63	10.9	1	12.5	13.2
Syracuse	44	11.0	7	87	10.7	5	12.1	13.7
Tacoma	25	12.2	2	51	8.3	0	12.9	12.0
Toledo	52	9.3	1	9	9.6	4	12.9	14.0
Trenton	31	13.2	4	74	12.8	5	17.2	17.7
Utica	17	8.6	1	28	9.7	0	15.2	16.0
Washington, D. C	114	12.2	19	110	11.4	18	15.6	16.0
White	68		12	104		9		
Colored	46	(6)	7	124	(6)	9	(6)	(6)
Waterbury	20	10.3	3	77	8.3	3	10.2	10.0
Wilmington, Del. [7]	24	11.9	1	23	9.4	2	15.0	14.3
Worcester	40	10.6	4	52	11.2	2	13.2	13.2
Yonkers	15	5.8	1	24	9.0	6	8.2	9.5
Youngstown	26	7.9	4	63	9.9	4	10.4	12.5

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended August 30, 1930, and August 31, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 30, 1930, and August 31, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929
New England States:								
Maine	3	2	2	3	3	17	0	0
New Hampshire	1				2		0	0
Vermont	1					2	0	0
Massachusetts	56	34	1		47	28	2	1
Rhode Island	4	3					0	0
Connecticut	6	11	2	2	2	1	1	2
Middle Atlantic States:								
New York	52	100	[1] 5	[1] 3	75	59	8	10
New Jersey	28	65	8	2	19	7	3	3
Pennsylvania	36	79			48	75	17	13
East North Central States:								
Ohio	24	46	9	14	12	32	6	5
Indiana	8	17	9		1	3	5	2
Illinois	68	97	4	13	10	40	5	0
Michigan	23	33			22	30	4	3
Wisconsin	5	12	18	16	44	29	4	1
West North Central States:								
Minnesota	14	8	3	8	2	5	1	2
Iowa	6	4				4	0	2
Missouri	19	11			10	18	5	8
North Dakota	4	5		3		6	0	1
South Dakota	4	2					0	0
Nebraska	1	3	1		6	13	0	0
Kansas	11	10			15	10	4	1
South Atlantic States:								
Delaware	1				1		0	0
Maryland [2]	16	16	7	2	4	3	1	1
District of Columbia	4	11			1	2	0	0
Virginia								
West Virginia	9	8	4		1	1	0	3
North Carolina	67	117			4	1	0	3
South Carolina	21	40	138	180			0	0
Georgia	16	26	4	17	4	5	0	6
Florida	5	24			4	1	0	1

[1] New York City only.

[2] Week ended Friday.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 30, 1930, and August 31, 1929*—Continued**

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929
East South Central States:								
Kentucky	-------	-------	-------	-------	-------	-------	0	0
Tennessee	10	28	4	16	-------	5	1	1
Alabama	16	49	6	7	27	19	2	0
Mississippi	14	30	-------	-------	-------	-------	1	-------
West South Central States:								
Arkansas	1	5	9	9	-------	-------	0	0
Louisiana	8	27	6	8	3	-------	3	0
Oklahoma [3]	3	26	2	10	1	4	3	1
Texas	13	39	18	12	2	2	0	0
Mountain States:								
Montana	-------	1	-------	-------	2	10	2	0
Idaho	-------	-------	-------	-------	-------	1	0	2
Wyoming	-------	-------	-------	-------	-------	1	0	1
Colorado	12	2	-------	-------	5	3	2	1
New Mexico	10	2	-------	-------	10	-------	0	0
Arizona	2	-------	-------	-------	-------	1	1	1
Utah [2]	-------	1	4	-------		-------	2	4
Pacific States:								
Washington	2	3	-------	-------	6	7	0	2
Oregon	3	3	1	5	8	6	0	0
California	24	28	15	7	44	23	4	3

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929
New England States:								
Maine	5	0	12	10	0	0	5	4
New Hampshire	0	0	1	4	0	0	2	1
Vermont	0	2	2	2	0	0	1	0
Massachusetts	23	2	42	38	0	0	12	7
Rhode Island	1	0	4	2	0	0	3	4
Connecticut	3	2	8	8	0	0	1	4
Middle Atlantic States:								
New York	29	26	42	46	0	8	30	69
New Jersey	1	2	16	19	0	0	19	20
Pennsylvania	7	13	53	61	0	3	55	43
East North Central States:								
Ohio	28	10	50	48	5	15	39	33
Indiana	4	0	10	20	15	13	19	10
Illinois	19	4	60	74	8	13	41	28
Michigan	5	3	41	53	7	5	21	17
Wisconsin	5	0	27	34	2	6	9	8
West North Central States:								
Minnesota	19	3	14	25	1	4	5	5
Iowa	6	1	5	17	6	5	1	12
Missouri	19	0	17	18	1	2	13	7
North Dakota	1	0	5	9	1	0	16	0
South Dakota	9	0	1	5	4	3	2	5
Nebraska	6	0	5	4	4	4	0	2
Kansas	48	1	12	16	7	9	18	13
South Atlantic States:								
Delaware	0	0	1	-------	0	0	8	10
Maryland [2]	5	1	9	17	0	0	38	33
District of Columbia	0	0	4	5	0	0	[4] 12	2
Virginia	-------	25	-------	-------	-------	-------	-------	-------
West Virginia	1	6	10	11	7	1	73	35
North Carolina	2	3	45	66	1	4	40	31
South Carolina	0	3	8	17	0	0	43	59
Georgia	0	0	4	22	0	0	35	65
Florida	0	0	5	2	0	0	1	5

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.
[4] Includes nonresidents.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 30, 1930, and August 31, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929	Week ended Aug. 30, 1930	Week ended Aug. 31, 1929
East South Central States:								
Kentucky	1	1	2	14	3	0	39	27
Tennessee	2	4	21	13	0	0	54	65
Alabama	3	1	32	34	1	0	30	30
Mississippi	4	0	1	13	0	0	27	30
West South Central States:								
Arkansas	8	0	3	6	2	1	38	21
Louisiana	13	0	1	7	0	0	36	20
Oklahoma [3]	8	0	3	22	10	6	43	57
Texas	1	0	9	15	7	6	12	13
Mountain States:								
Montana	0	0	5	8	0	0	1	3
Idaho	0	2	1		0	1	0	0
Wyoming	2	0	3	1	0	0	1	0
Colorado	2	0	8	4	1	9	15	9
New Mexico	2	0	1	1	10	3	15	6
Arizona	0	1	1		0	0	11	0
Utah [1]	0	0	3	7	0	0	4	1
Pacific States:								
Washington	1	0	9	13	11	8	5	6
Oregon	2	1	7	6	3	1	5	5
California	49	7	27	48	5	19	13	7

[1] Week ended Friday. [3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April, 1930										
Colorado	11	55	1		3,927		0	147	63	7
May, 1930										
Colorado	6	37			3,632		0	85	46	13
June, 1930										
Colorado	6	19			1,616		3	53	38	6
Hawaii Territory	6	30	2		36		1	6	0	8
July, 1930										
Illinois	23	350	40	133	505	1	16	414	185	103
Kansas	11	19	5	9	175		47	79	76	64
Missouri	10	70	3	112	126		1	103	83	89
Montana	5	3			16		2	35	9	9
Oregon	2	15	8		144		5	17	36	22
Virginia	16	53	232	71	451	111	28	106	15	259

April, 1930

Colorado:	Cases
Actinomycosis	1
Chicken pox	355
German measles	19
Impetigo contagiosa	1
Mumps	847
Rocky Mountain spotted or tick fever	3
Septic sore throat	2
Vincent's angina	2
Whooping cough	452

May, 1930

Colorado:	Cases
Chicken pox	301
German measles	12
Impetigo contagiosa	3
Mumps	703
Ophthalmia neonatorum	1
Rocky Mountain spotted or tick fever	5
Vincent's angina	1
Whooping cough	332

June, 1930	Cases
Chicken pox:	
Colorado	98
Hawaii Territory	38
Conjunctivitis, follicular:	
Hawaii Territory	14
Dysentery (amebic):	
Hawaii Territory	1
German measles:	
Colorado	4
Hookworm disease:	
Hawaii Territory	12
Impetigo contagiosa:	
Colorado	1
Hawaii Territory	4
Leprosy:	
Hawaii Territory	6
Mumps:	
Colorado	329
Hawaii Territory	24
Opthalmia neonatorum:	
Colorado	1
Rocky Mountain spotted or tick fever:	
Colorado	2
Tetanus:	
Colorado	1
Hawaii Territory	1
Trachoma:	
Hawaii Territory	4
Vincent's angina:	
Colorado	1
Whooping cough:	
Colorado	294
Hawaii Territory	8

July, 1930	Cases
Anthrax:	
Illinois	1
Chicken pox:	
Illinois	319
Kansas	30
Missouri	67
Montana	16
Oregon	65
Virginia	106
Conjunctivitis:	
Illinois	1
Diarrhea and dysentery:	
Virginia	1,758
Dysentery:	
Illinois	42
Kansas	1
Oregon	4
Food poisoning:	
Kansas	2
German measles:	
Illinois	27
Impetigo contagiosa:	
Kansas	1
Oregon	8
Lead poisoning:	
Illinois	15
Lethargic encephalitis:	
Illinois	5

Lethargic encephalitis—Continued.	Cases
Kansas	2
Oregon	1
Mumps:	
Illinois	350
Kansas	83
Missouri	38
Montana	17
Oregon	56
Ophthalmia neonatorum:	
Illinois	33
Missouri	4
Montana	2
Paratyphoid fever:	
Illinois	4
Kansas	6
Oregon	1
Puerperal septicemia:	
Illinois	9
Rabies in animals:	
Illinois	4
Missouri	4
Rocky Mountain spotted or tick fever:	
Montana	4
Scabies:	
Oregon	2
Septic sore throat:	
Illinois	8
Kansas	1
Missouri	25
Oregon	9
Tetanus:	
Illinois	11
Kansas	1
Missouri	1
Tick paralysis:	
Montana	1
Trachoma	
Illinois	9
Kansas	1
Missouri	41
Oregon	1
Trichinosis:	
Illinois	1
Tularaemia:	
Oregon	1
Virginia	3
Typhus fever:	
Virginia	13
Undulant fever:	
Illinois	10
Kansas	8
Missouri	17
Virginia	5
Vincent's angina:	
Kansas	4
Oregon	3
Whooping cough:	
Illinois	825
Kansas	210
Missouri	148
Montana	294
Oregon	174
Virginia	564

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,890,000. The estimated population of the 89 cities reporting deaths is more than 29,300,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended August 23, 1930, and August 24, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	574	919	
96 cities	208	366	424
Measles:			
45 States	559	540	
96 cities	169	111	
Meningococcus meningitis:			
46 States	94	94	
96 cities	38	58	
Poliomyelitis:			
46 States	325	103	
Scarlet fever:			
46 States	617	845	
96 cities	197	243	245
Smallpox:			
46 States	149	177	
96 cities	12	21	9
Typhoid fever:			
46 States	1,009	869	
96 cities	118	182	167
Deaths reported			
Influenza and pneumonia:			
89 cities	283	325	
Smallpox:			
89 cities	0	0	

City reports for week ended August 23, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	1	0		0	0	1	1
New Hampshire:								
Concord	0	0	0		0	0	0	0
Manchester	0	0	0		0	0	[illegible]	1
Nashua	0	0	1		0	0	0	0

City reports for week ended August 23, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND—con.								
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	0	0		0	0	0	0
Massachusetts:								
Boston	2	19	12	2	0	20	6	11
Fall River	1	1	3		0	1	0	0
Springfield	1	1	0		0	1	0	1
Worcester	0	3	1		0	2	0	0
Rhode Island:								
Pawtucket	0	0	0		0	0	0	0
Providence	0	2	0		0	0	0	1
Connecticut:								
Bridgeport	0	2	0		0	0	0	2
Hartford	0	2	2		0	3	1	6
New Haven	0	1	0		0	0	0	1
MIDDLE ATLANTIC								
New York:								
Buffalo	3	8	9		0	1	1	4
New York	10	80	33	4	2	39	10	70
Rochester	1	2	0		0	0	1	6
Syracuse	0	1	4		1	4	2	1
New Jersey:								
Camden	0	2	0		0	3	0	1
Newark	0	6	6	1	0	3	2	0
Trenton	0	1	0		0	0	0	0
Pennsylvania:								
Philadelphia	7	28	0	2	2	13	6	24
Pittsburgh	0	11	7		1	6	3	10
Reading	1	1	0		0	0	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	1	4	1		0	3	1	6
Cleveland	7	19	6	3	0	2	1	4
Columbus	4	2	2		0	6	1	0
Toledo	0	5	0	1	1	0	0	3
Indiana:								
Fort Wayne	0	1	0		0	0	0	2
Indianapolis	0	2	0		0	0	0	12
South Bend	0	1			0	1	0	1
Terre Haute	0	0	0		0	0	0	0
Illinois:								
Chicago	13	52	41	2	1	6	16	13
Springfield	0	0	1		0	0	0	1
Michigan:								
Detroit	3	22	8		1	8	1	2
Flint	0	2	1		0	4	0	0
Grand Rapids	0	1	1		0	0	0	2
Wisconsin:								
Kenosha	1	0	0		0	0	1	0
Madison	1	0	0			2	0	
Milwaukee	6	7	4		0	2	8	1
Racine		0						
Superior	0	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	[illegible]	0		0	0	0	0
Minneapolis	1	[illegible]	3		0	1	0	2
St. Paul	1	[illegible]	1		0	0	0	3
Iowa:								
Davenport	0	0	0			0	0	
Des Moines	0	1	0			0	0	
Sioux City	0	0	1			0	0	
Waterloo	0	0	0			0	0	
Missouri:								
Kansas City	0	[illegible]	0		0	1	0	4
St. Joseph	0	[illegible]	0		0	0	0	2
St. Louis	0	[illegible]	7			7	0	

City reports for week ended August 23, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL—continued								
North Dakota:								
Fargo	0	0	0	....	0	0	10	0
Grand Forks	0	0	0	....	....	0	0	....
South Dakota:								
Sioux Falls	0	0	0	....	....	0	0	....
Nebraska:								
Omaha	0	3	1	....	0	1	0	1
Kansas:								
Topeka	0	0	0	....	0	0	0	0
Wichita	0	0	0	....	0	0	0	0
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0	....	0	0	0	0
Maryland:								
Baltimore	1	13	2	....	0	1	0	5
Cumberland	0	1	0	....	0	0	0	0
Frederick	0	1	0	....	0	0	0	0
District of Columbia:								
Washington	1	6	2	....	0	8	0	6
Virginia:								
Lynchburg	0	0	0	....	0	0	0	0
Richmond	15	6	6	....	0	0	0	1
Roanoke	0	2	1	....	0	0	0	0
West Virginia:								
Charlestown	0	0	0	....	0	0	0	1
Wheeling	0	1	1	....	0	0	0	2
North Carolina:								
Raleigh	0	1	0	....	0	0	0	1
Wilmington	0	0	0	....	0	0	0	0
Winson-Salem	2	1	1	1	0	0	0	1
South Carolina:								
Charleston	0	0	3	4	0	0	0	2
Columbia	0	0	0	2	0	1	2	2
Georgia:								
Atlanta	0	3	0	....	3	0	0	3
Brunswick	0	0	0	....	0	0	0	0
Savannah	0	1	4	....	0	0	2	0
Florida:								
Miami	0	0	0	....	0	0	0	1
St. Petersburg	....	0	....	....	0	....	....	0
Tampa	0	1	0	....	1	0	0	2
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0	....	0	0	0	1
Tennessee:								
Memphis	0	2	1	....	0	0	1	1
Nashville	0	3	0	....	0	0	0	4
Alabama:								
Birmingham	0	3	0	1	0	1	0	4
Mobile	0	0	1	....	0	0	0	0
Montgomery	2	1	0	....	....	0	0	....
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0	....	....	0	0	....
Little Rock	0	0	0	....	0	0	0	2
Louisiana:								
New Orleans	1	6	7	1	1	0	0	5
Shreveport	0	0	0	....	0	0	0	0
Oklahoma:								
Oklahoma City	0	1	0	....	0	0	0	4
Tulsa	0	0	0	....	....	0	0	....
Texas:								
Dallas	0	4	7	....	0	0	0	3
Fort Worth	0	2	0	....	0	0	0	2
Galveston	0	0	0	....	0	0	0	0
Houston	0	3	3	....	0	0	0	3
San Antonio	0	2	1	....	0	0	0	3

City reports for week ended August 23, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MOUNTAIN								
Montana:								
Billings	0	0	0	----------	0	0	0	0
Great Falls	1	0	0	----------	0	0	0	0
Helena	0	0	0	----------	0	0	0	0
Missoula	0	0	0	----------	0	0	0	1
Idaho:								
Boise	0	0	0	----------	0	0	0	0
Colorado:								
Denver	0	7	5	----------	1	1	0	3
Pueblo	2	2	0	----------	0	1	2	1
New Mexico:								
Albuquerque	0	0	0	----------	0	0	0	0
Arizona:								
Phoenix	0	0	0	----------	0	0	0	0
Utah:								
Salt Lake City	3	2	0	----------	0	1	0	1
Nevada:								
Reno	0	0	0	----------	0	0	0	0
PACIFIC								
Washington:								
Seattle	2	2	0	----------	----------	11	6	----------
Spokane	1	2	0	----------	----------	2	0	----------
Tacoma	0	1	0	----------	0	0	0	3
Oregon:								
Portland	1	3	1	----------	0	3	2	0
Salem	1	0	0	----------	0	0	1	0
California:								
Los Angeles	4	22	8	5	2	4	7	11
Sacramento	1	2	0	----------	0	0	2	0
San Francisco	----------	10	----------	----------	----------	----------	----------	----------

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	0	2	0	0	0	0	1	0	0	10	18
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	10
Manchester	0	0	0	0	0	0	0	0	0	0	14
Nashua	0	0	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	0
Burlington	0	0	0	0	0	0	0	0	0	0	9
Massachusetts:											
Boston	14	9	0	0	0	15	3	6	0	47	169
Fall River	1	1	0	0	0	3	1	0	0	1	16
Springfield	1	1	0	0	0	0	1	1	0	3	21
Worcester	2	4	0	0	0	4	1	0	0	10	40
Rhode Island:											
Pawtucket	0	0	0	0	0	2	0	0	0	0	7
Providence	2	2	0	0	0	3	1	0	0	1	36
Connecticut:											
Bridgeport	2	1	0	0	0	3	1	0	0	0	27
Hartford	1	1	0	0	0	3	0	0	0	1	33
New Haven	1	0	0	0	0	1	2	0	0	6	31
MIDDLE ATLANTIC											
New York:											
Buffalo	5	10	0	0	0	7	1	1	0	49	95
New York	22	21	0	0	0	82	40	15	1	79	1,070
Rochester	1	3	0	0	0	2	1	0	0	13	63
Syracuse	1	1	0	0	0	1	0	0	0	22	44

City reports for week ended August 23, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
MIDDLE ATLANTIC—continued											
New Jersey:											
Camden	0	0	0	0	0	0	1	2	0	0	17
Newark	3	2	0	0	0	5	1	0	0	10	68
Trenton	1	2	0	0	0	1	1	2	0	0	31
Pennsylvania:											
Philadelphia	15	13	0	0	0	24	8	8	0	18	409
Pittsburgh	7	4	0	0	0	8	3	1	0	36	121
Reading	0	0	0	0	0	0	1	0	0	0	18
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	1	0	0	0	9	3	4	0	0	110
Cleveland	9	4	0	0	0	12	4	2	0	33	177
Columbus	3	3	0	0	0	3	1	0	1	13	50
Toledo	2	5	0	0	0	8	3	3	0	0	51
Indiana:											
Fort Wayne	0	0	0	0	0	1	2	0	0	0	21
Indianapolis	2	4	0	0	0	7	1	0	0	13	-------
South Bend	1	1	0	0	0	2	0	0	0	0	17
Terre Haute	0	0	0	0	0	1	0	0	0	2	23
Illinois:											
Chicago	24	26	0	0	0	44	5	2	1	65	551
Springfield	0	0	0	0	0	1	0	2	0	4	17
Michigan:											
Detroit	22	8	0	0	0	20	5	4	0	71	227
Flint	4	1	0	0	0	0	0	0	0	6	25
Grand Rapids	3	0	0	0	0	0	1	1	0	1	18
Wisconsin:											
Kenosha	0	1	0	0	0	0	0	0	1	4	4
Madison	0	0	0	0	-------	-------	0	0	-------	9	-------
Milwaukee	7	3	0	0	0	2	0	0	0	42	78
Racine	1	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Superior	1	1	0	0	0	2	0	0	0	0	5
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	1	0	0	0	1	0	0	0	3	19
Minneapolis	12	2	0	0	0	2	1	3	0	6	57
St. Paul	5	0	1	0	0	0	1	0	0	1	37
Iowa:											
Davenport	0	1	0	2	-------	-------	0	0	-------	0	-------
Des Moines	2	0	1	0	-------	-------	0	0	-------	0	29
Sioux City	0	0	0	0	-------	-------	0	0	-------	3	-------
Waterloo	0	0	0	0	-------	-------	0	0	-------	1	-------
Missouri:											
Kansas City	2	2	0	0	0	8	3	1	1	2	93
St. Joseph	0	0	0	0	0	2	0	1	1	1	26
St. Louis	10	8	0	1	0	5	7	6	0	3	168
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	2	-------
Grand Forks	0	0	0	0	-------	-------	0	0	-------	0	-------
South Dakota:											
Sioux Falls	1	0	0	0	-------	-------	0	0	-------	0	9
Nebraska:											
Omaha	1	2	0	0	0	1	0	0	0	0	38
Kansas:											
Topeka	2	0	0	3	0	0	1	0	0	0	6
Wichita	1	3	0	0	0	0	0	0	0	0	23
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	2	0	0	0	0	0	0	0	0	24
Maryland:											
Baltimore	5	4	0	0	0	19	9	7	0	25	155
Cumberland	0	0	0	0	0	0	0	1	0	0	7
Frederick	0	0	0	0	0	0	0	0	0	0	4
District of Columbia:											
Washington	4	4	0	0	0	15	4	2	0	9	144

City reports for week ended August 23, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC—continued											
Virginia:											
Lynchburg	0	0	0	0	0	2	1	2	1	0	16
Richmond	3	1	0	0	0	2	1	1	0	0	43
Roanoke	1	1	0	1	0	0	1	0	0	0	15
West Virginia:											
Charleston	1	0	0	0	0	0	1	[1] 9	0	0	14
Wheeling	0	0	0	0	0	0	1	0	0	5	16
North Carolina:											
Raleigh	0	1	0	0	0	0	1	1	0	0	7
Wilmington	1	0	0	0	0	1	0	0	0	14	14
Winston-Salem	1	1	0	0	0	3	1	0	0	2	17
South Carolina:											
Charleston	0	0	0	0	0	2	3	0	0	0	29
Columbia	0	0	1	0	0	0	0	1	1	0	18
Georgia:											
Atlanta	4	0	0	0	0	4	4	6	0	2	42
Brunswick	0	0	0	0	0	1	0	0	0	0	2
Savannah	0	0	1	0	0	2	1	0	1	1	24
Florida:											
Miami	0	0	0	0	0	1	1	1	0	0	18
St. Petersburg	0	---	0	---	0	1	0	---	0	---	12
Tampa	0	1	0	0	0	1	1	0	1	0	20
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	0	0	0	0	2	0	1	0	0	18
Tennessee:											
Memphis	1	1	0	0	0	3	7	7	2	0	74
Nashville	1	3	0	0	0	4	6	3	2	7	41
Alabama:											
Birmingham	3	0	0	0	0	2	5	0	0	2	50
Mobile	0	0	0	0	0	2	0	0	0	0	24
Montgomery	0	1	0	0	---	---	0	2	---	1	---
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0	---	---	0	0	---	0	---
Little Rock	0	0	0	0	0	0	1	0	2	0	---
Louisiana:											
New Orleans	1	5	0	0	0	7	4	2	1	6	137
Shreveport	0	0	0	0	0	0	0	0	1	0	31
Oklahoma:											
Oklahoma City	2	3	0	0	0	3	3	6	0	0	38
Tulsa	1	1	0	0	---	---	2	0	---	1	---
Texas:											
Dallas	2	3	1	0	0	1 [1]	4	0	1	4	61
Fort Worth	1	0	0	0	0	0	2	0	0	0	35
Galveston	0	0	0	0	0	0	0	0	0	0	7
Houston	1	1	0	2	0	4	0	4	0	0	64
San Antonio	1	1	0	0	0	7	1	1	0	0	73
MOUNTAIN											
Montana:											
Billings	0	1	1	0	0	0	0	0	0	4	8
Great Falls	0	2	0	0	0	0	0	0	0	0	10
Helena	0	0	0	0	0	1	0	0	0	3	6
Missoula	0	0	0	0	0	0	0	0	0	0	2
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	0	6
Colorado:											
Denver	2	3	0	0	0	9	1	3	0	20	82
Pueblo	0	0	0	0	0	0	0	0	0	1	5
New Mexico:											
Albuquerque	0	0	0	0	0	5	1	0	0	0	11
Arizona:											
Phoenix	0	0	0	1	0	0	0	0	0	0	---

[1] Includes nonresidents.

City reports for week ended August 23, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
MOUNTAIN—con.											
Utah:											
Salt Lake City	2	4	1	0	0	2	1	0	0	20	29
Nevada:											
Reno	0	0	0	0	0	1	0	0	0	0	2
PACIFIC											
Washington:											
Seattle	2	2	0	0			2	0		18	
Spokane	2	0	0	2			0	2		0	
Tacoma	1	1	1	0	0	0	0	0	0	0	25
Oregon:											
Portland	2	1	3	1	0	2	1	0	0	3	62
Salem	0	0	0	0	0	0	0	0	0	9	
California:											
Los Angeles	7	6	2	3	0	21	3	1	1	20	198
Sacramento	1	0	0	0	0	3	1	0	0	0	22
San Francisco	5		1				1				

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis: Cases	Poliomyelitis: Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	1	2	0
Massachusetts:									
Boston	1	0	0	0	3	0	2	15	1
MIDDLE ATLANTIC									
New York:									
Buffalo	0	1	0	0	0	0	0	17	0
New York	5	8	2	0	0	0	15	5	0
Rochester	0	0	0	0	0	0	1	8	1
Syracuse	0	0	0	0	0	0	2	11	0
New Jersey:									
Newark	0	1	0	0	0	0	1	0	0
Pennsylvania:									
Philadelphia	9	4	3	0	1	1	1	6	0
Pittsburgh	1	0	0	0	0	0	1	2	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	0	0	0	0	2	1
Cleveland	2	1	0	0	0	0	1	4	0
Indiana:									
Indianapolis	5	2	0	0	0	0	0	0	0
Illinois:									
Chicago	4	1	1	0	0	0	3	2	0
Michigan:									
Detroit	2	0	0	0	0	0	2	0	0
Flint	0	0	0	1	0	0	0	0	0
Grand Rapids	0	1	0	0	0	0	0	0	0
Wisconsin:									
Milwaukee	0	0	0	0	0	0	0	2	0

City reports for week ended August 23, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	1	0	0	0	0	1	0	0
Minneapolis	2	0	0	0	0	0	0	0	0
Iowa:									
Sioux City	0	0	0	0	0	0	0	1	0
Waterloo	0	0	0	0	0	0	0	1	0
Missouri:									
Kansas City	1	1	0	0	0	0	0	0	0
St. Louis	2	1	0	0	0	0	1	1	0
Nebraska:									
Omaha	0	0	0	0	0	0	0	2	0
Kansas:									
Wichita	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC									
Delaware:									
Wilmington	0	0	0	0	0	0	0	1	0
Maryland:									
Baltimore	0	0	0	1	0	0	1	0	1
District of Columbia:									
Washington	1	0	0	0	0	0	0	1	1
Virginia:									
Roanoke	0	0	0	0	0	0	0	1	0
West Virginia:									
Wheeling	0	0	0	1	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	2	0	0	0	0
Winston-Salem	0	0	0	0	2	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	0	1	0	0	0
Georgia:									
Atlanta	1	1	0	0	0	1	1	0	0
Brunswick	0	0	0		1	1	0	0	0
Savannah [1]	0	0	0	0	1	0	0	0	0
Florida:									
Tampa [1]	0	0	0	0	0	1	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	0	0	2	0
Louisiana:									
New Orleans	1	1	0	0	4	1	1	1	0
Shreveport	0	0	0	0	0	4	0	0	0
Oklahoma:									
Oklahoma City	0	1	0	0	0	0	0	5	0
Tulsa	0	0	0	0	0	0	0	2	0
Texas:									
Dallas	0	0	0	0	1	0	1	0	0
Fort Worth	0	0	0	0	0	2	0	0	0
MOUNTAIN									
Colorado:									
Denver	0	0	0	0	0	0	1	1	0
Pueblo	0	0	0	0	0	0	0	1	0
PACIFIC									
Oregon:									
Portland	1	0	0	0	0	0	0	0	0
California:									
Los Angeles	1	0	0	0	0	0	2	18	1

[1] Typhus fever, 5 cases: 4 cases at Savannah, Ga., and 1 case at Tampa, Fla.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended August 23, 1930, compared with those for a like period ended August 24, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, July 20 to August 23, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929
98 cities	38	68	39	67	[2] 38	[3] 63	31	61	[4] 34	61
New England	22	58	33	54	31	45	40	38	40	63
Middle Atlantic	35	75	35	67	[5] 35	70	23	59	28	58
East North Central	49	103	49	99	48	81	36	86	[6] 41	69
West North Central	34	21	34	25	[7] 30	31	27	23	25	25
South Atlantic	35	28	37	47	16	30	35	47	37	75
East South Central	27	27	7	34	[8] 27	[3] 30	34	82	13	55
West South Central	34	99	37	95	[9] 54	118	52	122	67	141
Mountain	69	9	34	9	17	35	17	44	43	26
Pacific	33	31	52	46	66	43	35	31	[10] 26	29

MEASLES CASE RATES

98 cities	107	69	68	49	[2] 51	[3] 30	33	24	[4] 28	20
New England	175	101	97	97	91	31	60	29	60	38
Middle Atlantic	152	27	91	35	[5] 67	15	41	15	33	13
East North Central	60	149	34	84	28	58	19	35	[6] 20	33
West North Central	63	58	42	38	[7] 47	33	30	13	19	8
South Atlantic	46	17	55	11	22	9	22	15	18	0
East South Central	61	7	40	7	[8] 27	[3] 7	20	0	7	14
West South Central	7	27	11	8	[9] 14	19	7	23	0	4
Mountain	172	70	154	26	112	61	43	52	26	52
Pacific	191	77	118	43	73	24	50	46	[10] 55	39

SCARLET FEVER CASE RATES

98 cities	50	59	39	40	[2] 32	[3] 44	31	39	[4] 33	41
New England	66	56	55	63	42	52	51	49	47	45
Middle Atlantic	36	19	22	24	[5] 19	23	18	17	27	15
East North Central	76	110	50	62	46	72	39	50	[6] 34	63
West North Central	30	77	49	35	[7] 28	44	28	40	34	58
South Atlantic	37	60	40	28	18	41	26	73	27	34
East South Central	54	27	7	34	[8] 18	[3] 15	54	14	34	68
West South Central	49	57	56	38	[9] 45	42	34	38	37	65
Mountain	26	26	60	9	69	44	43	78	86	44
Pacific	45	65	40	48	45	56	38	53	[10] 29	51

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930 and 1929, respectively.
[2] Rochester, N. Y., Wichita, Kans., Memphis, Tenn., and Houston, Tex., not included.
[3] Montgomery, Ala., not included.
[4] Racine, Wis., and San Francisco, Calif., not included.
[5] Rochester, N. Y., not included.
[6] Racine Wis., not included.
[7] Wichita, Kans., not included.
[8] Memphis, Tenn., not included.
[9] Houston, Tex., not included.
[10] San Francisco, Calif., not included.

Summary of weekly reports from cities, July 20 to August 23, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

SMALLPOX CASE RATES

	Week ended—									
	July 26, 1930	July 27, 1929	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929
98 cities	7	8	4	7	[2] 2	[3] 5	3	7	[4] 2	3
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	[5] 0	0	0	3	0	0
East North Central	8	16	2	13	6	12	3	16	[6] 0	4
West North Central	21	21	13	6	[7] 4	10	6	4	8	6
South Atlantic	2	0	4	0	2	0	0	0	2	0
East South Central	20	7	0	7	[8] 0	[3] 7	7	7	0	0
West South Central	4	8	15	4	[9] 5	0	4	0	7	8
Mountain	17	9	0	26	0	0	0	9	0	26
Pacific	26	22	26	34	5	17	14	12	[10] 16	17

TYPHOID FEVER CASE RATES

98 cities	18	18	18	19	[2] 17	[3] 17	21	20	[4] 20	30
New England	7	29	7	11	4	13	4	11	16	27
Middle Atlantic	7	7	5	11	[5] 10	11	15	19	14	34
East North Central	13	8	13	10	11	11	10	5	[6] 9	12
West North Central	47	13	23	33	[7] 20	15	28	6	21	13
South Atlantic	38	37	48	22	60	22	40	39	55	51
East South Central	74	103	121	150	[8] 54	[3] 45	148	123	88	103
West South Central	41	69	45	53	[9] 5	61	45	46	26	88
Mountain	17	44	26	9	34	9	26	61	26	70
Pacific	12	7	19	19	12	29	14	17	[10] 10	5

INFLUENZA DEATH RATES

91 cities	3	3	1	3	[2] 3	1	1	3	[4] 3	3
New England	0	2	0	0	0	0	0	0	0	2
Middle Atlantic	1	2	0	2	[5] 2	1	2	2	3	3
East North Central	3	4	1	4	1	1	0	2	[6] 1	4
West North Central	3	3	0	0	[7] 3	6	3	3	0	0
South Atlantic	4	4	5	4	9	0	0	0	7	2
East South Central	0	0	0	15	[8] 0	0	0	22	0	0
West South Central	11	4	0	8	[9] 0	0	0	12	4	8
Mountain	0	9	0	9	17	0	0	17	9	9
Pacific	3	0	3	0	6	0	0	3	[10] 10	0

PNEUMONIA DEATH RATES

91 cities	57	49	53	54	[2] 54	53	55	57	[4] 47	54
New England	40	31	38	43	42	38	38	52	51	25
Middle Atlantic	72	57	62	61	[5] 61	60	72	71	55	60
East North Central	38	38	44	47	47	43	28	35	[6] 28	47
West North Central	56	51	47	39	[7] 44	45	27	33	35	48
South Atlantic	79	60	60	51	66	41	68	62	48	73
East South Central	103	52	59	75	[8] 51	60	59	90	74	37
West South Central	77	86	61	78	[9] 56	121	92	78	61	66
Mountain	77	61	60	61	69	61	120	35	51	52
Pacific	9	25	46	50	43	41	49	72	[10] 67	50

[2] Rochester, N. Y., Wichita, Kans., Memphis, Tenn., and Houston, Tex., not included.
[3] Montgomery, Ala., not included.
[4] Racine, Wis., and San Francisco, Calif., not included.
[5] Rochester, N. Y., not included.
[6] Racine, Wis., not included.
[7] Wichita, Kans., not included.
[8] Memphis, Tenn., not included.
[9] Houston, Tex., not included.
[10] San Francisco, Calif., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended August 16, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended August 16, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia [1]					
New Brunswick					10
Quebec			1	2	14
Ontario	6	2	57	5	9
Manitoba			1		2
Saskatchewan					4
Alberta			14		4
British Columbia				2	1
Total	6	2	73	9	44

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended August 23, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended August 23, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Poliomyelitis	1
Diphtheria	27	Scarlet fever	34
Erysipelas	2	Tuberculosis (pulmonary)	18
Influenza	1	Tuberculosis (other forms)	5
Measles	2	Typhoid fever	19
Mumps	6	Whooping cough	28

CZECHOSLOVAKIA

Communicable diseases—June, 1930.—During the month of June, 1930, cases of communicable diseases were reported in Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	10	1	Puerperal fever	55	23
Cerebrospinal meningitis	12	4	Scarlet fever	1,632	39
Diphtheria	1,366	80	Trachoma	292	
Dysentery	9		Typhoid fever	439	30
Malaria	57		Typhus fever	1	
Paratyphoid fever	34				

PORTO RICO

San Juan—Communicable diseases—Five weeks ended August 9, 1930.—During the five weeks ended August 9, 1930, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	2	Tetanus	4
Dysentery	1	Tuberculosis	74
Malaria	8	Typhoid fever	7
Measles	1	Whooping cough	3
Ophthalmia neonatorum	2		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30
Afghanistan	C										[1] P						P	
China:																		
Canton	C				3		2				2	1						
Manchuria—Dairen	C	1																
Swatow	C				3	4	3							1				
India	C	5,914	10,817	41,462	56,311	10,088	10,103	10,162	6,767	6,728	5,520							
	D	3,371	5,866	27,906	44,878	7,802	7,110	6,455	4,344	3,712	3,095							
Bassein	C			7	7													
	D			5	5													
Bombay	C		4												2			
Calcutta	C	269	354	647	609	78	78	94	77	81	53	49	37	18	10	17		
	D	153	220	414	372	44	36	36	63	54	28	23	23	7	7	10		
Negapatam	C						1											
	D						1											
Rangoon	C	3	2	1	9	1	1	2	2	1								
	D	1	2	1	3	1	1	1	1	1								
India (French):																		
Chandernagor	C	4	1	6	6			1	2			1						
	D	2	3	5	6			1	1									
Karikal	C	4	12	1					3									
	D	1	9	1					3									
Indo-China (see also table below):																		
Pnompenh	C	9		2	1	5	10	11	14	9	16	7		5	3	3		
	D	7	6		5	1	4	7	6	6	9	5	2	3	2	1		
Saigon and Cholon	C	5	14	76	160	17	19	7	5	7	1	1	1	2	2	1		
	D	4	6	55	101	11	10	2		3					1			
Philippine Islands: [2]																		
Ports—																		
Cebu	C								1	20	13	13	9	5	4			1
	D									9	7	12	8	4	4			1

Iloilo	C										1	11	17	9	19	32	4	3
	D											9	13	10	18	19	9	4
Manila	C				1										1			16
	D																	5
Provinces—																		
Antique	C													14	4		3	2
	D													7	4		2	1
Bohol	C														45	67	31	24
	D														26	37	15	11
Bulacan [3]	C					1			2		1	1	2	1				1
	D					1												1
Capiz	C											2	1	1	1			1
	D											1	1	1	1			
Cebu [3]	C				1	13	26	118	198	313	222	115	63	55	37	4		1
	D				1	11	23	50	86	131	83	60	29	32	27	3		1
Iloilo [3]	C							1	1	20	45	85	159	143	227	176	88	74
	D								1	10	23	64	96	77	164	119	64	51
La Union	C										1							
Leyte	C							21	26	11								
	D							12	7	11								
Masbate [3]	C								10	14	32	25	21	15	27			
	D								3	2	18	5	10	5	11			
Misamis, Occidental	C									1	2							
	D									1	2							
Negros, Occidental [3]	C				10	5	55	50	30	62	163	172	171	151	99	50	72	40
	D				7	2	27	36	23	42	90	122	114	97	72	34	47	31
Negros, Oriental [3]	C									1	1	6	15	6	2			
	D										1	3	9	1	3			
Nueva Acija	C												1					
	D												1					
Pampanga	C							1	1	2								1
Pangasinan	C									2		1		1				
	D									2				1				
Rizal	C						1				1							
	D						1				1							
Samar	C														5	4	10	
	D														5	3	8	
Surigao	C														15	4	21	3
	D														9	2	10	3
Tarlac [3]	C													1				
Siam	C	7	1	29	33	8	10	6	3	8	3	8						
	D	4		13	21	3	9	4	3	4	1	3						
Bangkok	C	2	2	15	9	5	3	3	1		3	4	1	1		1		
	D		1	4	3		3		2		1	1	1	1		1		
Nagara Pathom	C	1		10														
	D	1		2														
Songkla	C										8		2					
	D										4		2					

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Figures for cholera in the Philippine Islands for the weeks ended July 26 and August 2, 1930, have been corrected from late reports since the last issue of the Public Health Reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930				July, 1930				August, 1930				
						7	14	21	28	5	12	19	26	2	9	16	23	30
On vessel:																		
S. S. at Suva, Fiji Islands	C	1																
S. S. Sutley at Batavia, from Calcutta	C	1																
S. S. Sassari at Massoua, from Jeddah	C				1													
	D				1													
On small boat at Port Cebu, from Bantayan Island	C					1												
	D					1												

Place		January, 1930	February, 1930	March, 1930	April, 1930			May, 1930			June, 1930			July, 1930		
					1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31
Indo-China (French) (see also table above):																
Annam [1]	C	1	4	52			60		20	3	2	14				1
Cambodia [1]	C	147	90	81	18	6		5	31	52	56	88				43
Cochin-China [1]	C	177	65	82	48			188	224	259	147	126				46

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30
Algeria:																		
Algiers	C										1	2			1			
Constantine	C					1				1								
Oran	C											2	1		1		1	
Argentina:																		
Andalgala [1]																		
Villa Lia	D	2																
Azores: Ponta Delgada	C			8														
	D			5														
Belgian Congo	C									2				1		1		
	D									2				1		1		
British Africa: Gambia	C																4	
British East Africa (see also table below):																		
Tanganyika	C	7		44														
	D			20														
Uganda	C	47	98	117	227	121	77	105	103		50							
	D	43	87	105	195	75	70	93	90		47							
Canary Islands: Las Palmas	D														1			
Ceylon:																		
Colombo	C	3	4	1	6	1				1	2					1		
	D	3	4	1	5	1				1	2					1		
Plague-infected rats		3	2	4		1												
Chile: Antofagasta	C	1	1	1														
	D		2	1														
Dutch East Indies:																		
Batavia and West Java	C	153	124	87	82	19	27	28	24	19	25	18						
	D	150	122	81	82	19	27	28	24	19	25	18						
Plague-infected rats		3	3	8	5	3	1								1			
Java and Madura	D	296	223	173	185	40	55	56										
Ecuador (see table below).																		

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9-Mar. 8, 1930	Mar. 9-Apr. 5, 1930	Apr. 6-May 3, 1930	May 4-31, 1930	Week ended— June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30
Egypt:																		
Alexandria	C	1	4	2	13	3	6	6	4	8	8	3	4	2	2	4	3	3
	D		1	2	3	2		2	5	2	3	2	3	2	1	3		5
Assiout	C			14	20	4	2	3		1	1							
	D			5	5		1		2	1	1							
Beheira	C		4															
Beni-Suef	C		4														1	
Dakahlieh	C	8	5	5	11	1												
	D		1		2													
Gharbieh	C			1										3				
	D			1										1				
Girga	C			1							1							
Minieh	C				7	1	1	4	4	2	1							
	D				1		1											
Port Said	C			1	2	1			1				1	1				
France:																		
Marseille	C																	2
St. Ouen	C											1						
	D											1						
Greece (see also table below):																		
Patras	C		1					1				1						
Pyrgos	C		1															
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats								1										
India	C	5,639	4,087	2,215	648	55	59	62	64	70	75							
	D	3,940	3,344	1,960	635	42	52	43	50	46	46							
Bassein	C		3															
	D		1															
Bombay	C	1	7	4	6	1		2					1					
	D	1	5	8	5			1	1				1					
Plague-infected rats		31	86	108	81	6	7	8	5	13	14	10	15	10	8	9		

Madras Presidency	C	230	157	44	38	26	10	3		10	1	10				7		
	D	140	87	19	11	15	2	5		4	1	9				1		
Rangoon	C	7	3	5	4				1				2	2	1			
	D	6	3	4	3				1				2	1	1			
Plague-infected rats		7	3	4	5			1		2	2		2	4		2		
India (Portuguese)	D				7													
Indo-China (see also table below):																		
Pnompenh	C			3	3	6					1	1			2			
	D	13	13	4	1	5	1		1		1	1						
Saigon and Cholon	C		1		1	1		1										
	D		1					1										
Iraq: Baghdad	C	6	7	6	37	12	4	8	4	10	4	2	2	4	3	2		
	D	1	4	2	18	7	3	5		5		1	1		2	1		
Japan: Osaka (vicinity of)—Plague-infected rats		6	4	3														
Kwang-Chow-Wan	C	25	7	37	34	23		8								4		
Madagascar (see also table below): Tamatave	C			1		1												
Morocco	C	48	55	121	71	2		1					1		8			
	D	13	18	45	34	4									1			
Nigeria: Lagos	C	7	13		2	1		3	1	1				2	1			
	D	7	5		2	1		3	1	1				2	1			
Plague-infected rats		42	25	7	17	1	4	1	5	2	3	6						
Senegal (see table below).																		
Siam	C	17	16	5	5													
	D	13	15	6	4													
Bangkok	C	1	5		5									1	2			
	D	1	4		4										2			
Nagara Pathom	C	5	1	10														
	D	6	1	9														
Nagara Rajsima	C	2	1	1										1				
	D		1	1										1				
Syria: Beirut	C						2	5	5		2	4	3		1		1	3
Tunisia:																		
Sfax district	C	22		1	21	6		3					6		1			
Tunis	C	5	1	4	1		1				1	4						
	D					1					1							
Union of Socialist Soviet Republics:																		
Salsk Region	C					1			1									
	D					1												
Stavropol Region	C					1												
	D					1												
Union of South Africa:																		
Cape Province	C	2	1		P	1												
	D	1	1															
Orange Free State	C	11	5	1														
	D	3	3															
Transvaal	C	2	1															
	D		1															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
British East Africa (see also table above):							
Kenya	C	69	85	16	171	107	36
Uganda	C	109					50
	D	90					47
Ecuador: Guayaquil	C	2	2	0			
	D	2		0			
Plague-infected rats		2	2	0			
Greece (see also table above)	C			1		1	
Indo-China (see also table above)	C	30	27	4		11	1
Madagascar (see also table above):							
Ambositra Province	C	49	25	14	1		
	D	41	20	12	1		
Antisirabe Province	C	22	38	46	19		
	D	22	36	45	19		
Itasy Province	C		4				
	D		4				
Miarinarivo Province	C	25	14	1	5	1	
	D	25	14	1	5	1	

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
Madagascar—Continued.							
Moramanga Province	C	7	5	3	1	3	
	D	4	5	3		3	
Tananarive Province	C	110	52	39	15	6	
	D	107	52	38	14	6	
Senegal:							
Baol [1]	C		18	24	13	2	62
	D		8	12	11	2	48
Dakar [1]	C			2	52	53	140
	D			2	42	117	122
Louga [1]	C	2		33	54	60	138
	D			10	27	21	103
Thies [1]	C		3	12	21	52	54
	D		2	9	8	35	30
Tivaouane [1]	C		11	71	135	43	119
	D		8	38	69	28	70

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16	23
Algeria:																	
Algiers	C	1	5	1	3						1						
Constantine	C							1				1					
Oran	C		1														
Arabia: Aden	C	2	3	1						1							
Bolivia: La Paz.[1]																	
British Borneo: Sarawak	C	19															
British East Africa (see also table below).																	
Tanganyika	C	49	103	57	409	385	755	196	274	64	4						
	D	8	7	14	70	154	90	31	26	13	2						
British South Africa:																	
Northern Rhodesia	C		9	1	59												
	D			2	9												
Southern Rhodesia	C	6		66	155	75	1	3		1	12	18					
	D			1	13												
Canada:																	
Alberta	C	4	10	4							2	1	2	1			
Edmonton	C	1	4	3													
British Columbia—Vancouver	C	16	20	17	4	1	1			2	2	1	1	1	1		2
Manitoba	C	2	4	4	10			4									
Ontario	C	86	100	77	82	14	10	13	10	3	5	6	10	8		3	4
North Bay	C	1			1												
Ottawa	C	11	19	21	25	6		8	1	1	1	4	7	5	1	1	
Toronto	C				4	2	1	1			1						
Quebec	C								4	3							
Montreal	C													7			
Saskatchewan	C	76	47	41	39		12	10			2		3				8
Regina	C				4												
Ceylon:																	
Angoda, Western Province	C	10		6													
	D	1		2													
Colombo	C	3															
	D	2															

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16	23
China:																	
Canton	C	11	6	3		1											
	D	3	2	3													
Chungking	C	P		P	P	P			P	P	P	P	P				
Foochow	C	P		P	P		P		P								
Hong Kong	C	62	38	18	12	2	1	1			2						
	D	51	25	23	9	1		1	1		1						
Manchuria—																	
Harbin	C			1	20												
Kwantung—Dairen	C	5		2	8		11	5		8							
	D				4			1									
Nanking	C	P	P	P	P	P	P				P	P	P	P			
Shanghai—																	
Foreigners only	C	2	2	3	2	1	1	1	2	1	1	1	1	3			
Including natives	D	7	10	10	5	1		1	1								
Swatow	D	6	6	3	6	1		1	2	1				1			
Tientsin	C	1	2	2	1												
Chosen (see table below).																	
Columbia:																	
Barranquilla	C	102	2	1													
Buenaventura	C	1		15	4	1	1		4	4	3	2	1				
Costa Rica:																	
Port Limon	C			6	2	2											
San Jose [2]	C		10	7	2												
Curacao (alastrim)	C		14	2	2		1			2							
Dutch East Indies:																	
Borneo	C		185	90	16	2	10				2						
	D		12	31	1		1										
Java—																	
Batavia and West Java	C	14	78	64	12	1	4	6	2	3	1	3	1	1		1	
	D	7	6	11	7		1	2		2	1	1	1	1		1	
East Java and Madura	C			4								1					
Sanggi Islands	C	12	5	160	26												
	D		1	24	5												
Sumatra	C		48														
	D		5														

Egypt: Port Said	C			1	1						2		1				
Great Britain:																	
England and Wales	C	1,530	1,700	1,427	1,417	237	266	241	182	156	138	126	109	70	86	95	
Ashton under Lyne	C	29	15	18	17			3	4		4	2	2				
Bradford	C	2		3	2					1							
Cardiff	C		2	3						2							
Leeds	C	11	16	2						1							
London	C	699	710	602	637	130	136	125	107	84	52	62	48	36	50	41	
London and Great Towns	C	1,156	1,239	1,066	1,078	197	208	190	158	127	96	102	83	61	73	71	
	D	5	3	3													
Sheffield	C		8	2													
Stoke-on-Trent	C	41	122	85	62	3	10	15	4	3	2	1	3	1	1		
Scotland	C					1		3			1						
	D										1						
India	C	36,036	39,329	34,843	22,835	3,686	3,559	3,174	2,552	2,258	2,006						
	D	7,710	9,109	6,983	5,451	1,065	913	905	648	733	580						
Bombay	C	638	718	430	218	36	35	23	19	17	15	11	7	6	2		
	D	314	431	270	161	27	23	19	10	13	9	9	2	5	2		
Calcutta	C	399	361	495	302	46	45	45	25	27	19	13	14	4		12	
	D	287	305	403	258	50	37	29	30	17	17	12	10	4		8	
Cochin	C	184	291	183	37	4	1	10	1	27		4	2	2	4	4	
	D	29	35	13	8	2	1	1		17							
Karachi	C	38	33	30	14	5		1	1				1	2		2	
	D	16	47	17	4	2		1						2		1	
Madras	C	159	173	133	72	9	10	8	8	6	10	17	16	19		9	
	D	29	36	27	15	6	3	1		4	1	3	4	3		5	
Moulmein	C	143	146	43	89		9	6	6	4	10	3	1				
	D	40	41	7	21		3	3	1	3	4	1	2				
Negapatam	C	1			1		1		1			1		2		2	
Rangoon	C	7	10	4	6	1	5	1	2	2	1	1		1	1		
	D	2	5		1			1	1								
Tuticorin	C				5			1									
Vizagapatam	C	9	69	6	5		1										
	D	1	18	2	3												
India (French):																	
Chandernagor	C	11	6	10	24	4	8	5	2	3	1	4					
	D	5	2	2	7			2	1	1	1	1					
Karikal	C	12	24	19	12	4	3	1	3	1		1					
	D	8	7	8	3	2	2	1	3	1		1					
Pondicherry Province	C	52	21	24	40	4	4	9	6	4	9	8	5				
	D	40	13	20	36	4	4	9	6	3	9	8	5				
India (Portuguese)	C	50	38	44	47		3	18	7	1							
	D	5	2	8	8		2	2	6								
Indo-China (see also table below):																	
Pnompenh	C				3							1					
	D			2		1						1				1	
Saigon and Cholon	C	4	3	5	3	1											
	D	2	1	5	2									1	1	1	

[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued.

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930 7	14	21	28	July, 1930 5	12	19	26	August, 1930 2	9	16	23
Iraq:																	
Baghdad	C	3		8	1	1				1	1	1				1	
	D	1		1	1							1				1	
Basra	C	1		1													
Mossoul Liwa	C	12		22	21		1		3	47	20						
	D	2		3	3		1			19	1						
Ivory Coast (see table below).																	
Jamaica (alastrim)	C				2												
Japan: Tokyo	C			1													
	D			1													
Macao	D	2	3	2	1												
Mexico (see also table below):																	
Jalisco (State) Guadalajara	D	14	22	20	7	4		5	6	3	1				1		
Juarez	C	3	2					6									
	D	1						1									
Mexico City and surrounding territory	C	38	106	99	80	17	23	20	17	10	12	4	11	2	3		
	D	21	31	47	32	5	4	3	5	2	3	1	2	1	3		
Progreso	C				1												
	D				1			1									
San Luis Potosi	C	1															
	D	1															
Morocco (see table below).																	
Nigeria: Lagos	C	2	1	1					1								
Philippine Islands: Sarangani and Balut Islands	C	3															
Poland	C	2		7	3												
Portugal: Lisbon	C	7	7	8	8	1		2	7		7		6		6	5	
Rumania	C	1	2														
Siam	C	2		8	2					2		4					
	D			4								3					
Somaliland, British: Boales	C	19	2														
	D	2	6														
Spain	C						4		8		1	1	3	2			
Straits Settlements	C		5	5	11	5		1	3	1	2	7	1	1	1	1	
	D		1	2	3	1		1		1	1	1				1	
Sudan (Anglo-Egyptian)	C	79	60	42	19	4	8	1	54	8	1		3				42
	D	6	5	4	2				3		1						3

Sudan (French) (see table below).																	
Switzerland: Berne Canton	C												1	1			
Syria (see table below).																	
Taiwan: Taihoku (see table below).																	
Tunisia: Tunis	C	3	3	4	2			2					1				
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P												
Orange Free State	C	P	P														
Transvaal	C	P	P														
Upper Volta	C	26	2	3	1			8	5								
Zanzibar	C		13														
On vessel:																	
S. S. Tairoa, at Liverpool, from London	C	1															
S. S. Karagola, at Lourenco Marques, from India	C	1															
S. S. Elysia, at Port Sudan, from Bombay	C			1													
S. S. Naldera, at Port Said	C				1												
S. S. Manoa, from Honolulu to San Francisco	C								1								

Place		January, 1930	February, 1930	March, 1930	April, 1930			May, 1930			June, 1930			July, 1930		
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (see also table above)	C	460	434	26	261				173	132	80	133				238
Ivory Coast	C			7												
Sudan (French)	C	229	213	609	371		150	40	56	178	76				34	
	D	25	11	49	30		6	7	7	18	18					
Syria: Beirut	C	70	18	17	10	2	7			7	6	1				2
Taiwan: Taihoku	C		43	58	10	2										

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
British East Africa (see also table above):							
Kenya	C	12	12	175	174	171	142
Uganda	C	184	109			78	
	D	155	99			69	
Chosen	C	1	4		5	2	
	D		1		1	1	

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
France	C	9	23	8		3	
Mexico: Durango (see also table above)	D	12	6	5	4	4	3
Morocco	C	29	74		10	18	5
Turkey	C	215	114		3	16	
	D	66	42				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	17	24	31	June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16	23
Algeria:																				
Algiers	C	4	6	8	1	2	4	8	2		1			1	2	3				
Constantine Department	C	5	11	15		4		2	11		1			1	1					
Oran	C							3				4		2	1			1		
Arabia: Aden	C		1																	
	D		1																	
Bolivia: La Paz.[1]																				
Brazil: Porto Alegre	C	2			1															
Bulgaria	C	13	9	15	1		5		1		9	6		4	5	1		1		
	D	1		1	1		1		1						1					
China:																				
Manchuria—Harbin	C	1	4	52					2											
Shanghai	C		1																	
Chosen (see table below).																				
Czechoslovakia (see table below).																				
Egypt:																				
Alexandria	C			1							1	1	1						1	
Beheira Province	C	18	2	2	9	21	9	10	17	16	7	5		5	1	9				
	D	5			4	4	4	1	1	1		2		1		1				
Cairo	C	1															2			
Port Said	C	1																		4
Great Britain: Scotland—																				
Dunfermline	C													1						
Glasgow	C					1														
	D					1														
Greece (see table below):																				
Iraq: Baghdad Liwa	C		2																	
Ireland:																				
Irish Free State—																				
Galway County—Oughterard	C															2				
Kerry County—Dingle	C			5																
Leitrim County—Mohill	C											9				1				

Mayo County—																				
Ballina	C							2		1				1						
Swinford	C					7	7													
Westport	C														2		1			
Roscommon County—																				
Roscommon	C														1					
Strokestown	C														1					
Wicklow County—Shillelagh	C									1		3	1		1					
Northern Ireland—Cookstown	C	3																		
Latvia (see table below).																				
Lithuania (see table below).																				
Mexico: Mexico City, including municipalities in Federal District	C	9	4	4		2		4	2	3	1	3	2		2	1	2	2		
	D		1	4				3		1							1	1		
Morocco	C	21	38	15	3	6	1	1	1		6	8		4	3	4				
	D		7	3																
Palestine	C	1	6	1		2			2				3	1	1	1		1	1	
Poland	C	183	228	243	64	45	34	28	39	15	26	37		24		12	10	15		
	D	8	13	15	2	2		1	3	3	2	3		4			1			
Portugal:																				
Lisbon	C			4																
Oporto	C	1	2	1															1	
Rumania	C	293	185	186	60	58	61	48		32	26									
	D	23	12	11	10	11	6	8		3	2									
Spain: Valencia	C									2		1		3						
	D													1						
Tunisia	C	3			2	2	1	1			2	16			14	10	2	5		
Turkey (see table below).																				
Union of South Africa:																				
Cape Province	C	P	P	P	P	P	P	P			P	P	P	P						
Natal	C	3	P	P	P	P		P			P		P	P						
Orange Free State	C	P	P		P	P	P	P			P	P	P	P						
Transvaal	C			P																
Yugoslavia (see table below).																				

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
China: Harbin	C			37	204	240	
Chosen: Seoul	C		17		3		
Czechoslovakia	C	10	2	42	29	12	
Greece: Athens	C	12	6	3	1	3	3
Latvia	C	18				3	3
Lithuania	C	2	70	62	73	27	16
	D		5	4	4		2
Turkey	C	2	3	1	3	16	6
Yugoslavia	C	26	33	46	22	16	
	D	3	5	2	4	1	

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

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CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

July 13–August 9, 1930

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized below. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of Disease."

Poliomyelitis.—In California, where the poliomyelitis outbreak first became apparent, there has been a decline from about 98 cases per week at the middle of July to 56 cases during the second week in August. There have, however, been appreciable increases during the 4-week period of this report in other regions, notably in the northwest Mississippi Valley, in the southern Mississippi Valley, and in the North Atlantic coast sections. The States bordering on the Great Lakes had, for the period of this report, shown no great increase beyond the seasonal expectancy. Later advices, however, for the week ended August 16, suggest that the incidence in the Great Lakes region has risen rather sharply, so that to the middle of August the only unaffected region has been the South Atlantic group of States.

The summer rise of poliomyelitis has, during recent years, reached its peak by about the third week in September. It is possible, therefore, that by the time this report appears, the outbreak will, in most sections, be at or near its worst stage.

In Table 1, the number of cases reported during the summer are shown by 4-week periods for the years 1930 and 1929, by geographical section. It is to be noted that during the last 4-week period shown, the incidence in most regions was from 1.5 to more than 15 times as high as last year. The recent incidence is running slightly in excess of that of 1927, when the latest previous epidemic occurred.

[1] From the Office of Statistical Investigations, U. S. Public Health Service. The number of States included in the statistics of various diseases is as follows: Diphtheria, 42; influenza, 31; measles, 38; meningococcus meningitis, 42; poliomyelitis, 31, typhoid fever, 41.

TABLE 1.—*Poliomyelitis cases reported in various geographic regions by 4-week periods*

Four-week period ended—	All regions [1]		Mountain and Pacific		West North Central		East North Central		South Central		New England and Middle Atlantic		South Atlantic	
	1929	1930	1929	1930	1929	1930	1929	1930	1929	1930	1929	1930	1929	1930
May 17	71	67	13	36	7	2	9	4	10	2	17	19	15	4
June 14	78	167	18	97	12	6	12	12	5	33	18	7	13	12
July 12	96	551	21	330	7	33	9	31	10	106	29	30	20	21
Aug. 9	193	786	22	326	13	117	25	37	6	155	79	126	48	25

[1] 31 States.

Typhoid fever.—During the current 4-week period 2,912 cases of typhoid fever were reported, as compared with 2,630 cases last year and 2,926 the year before. The current incidence represents a considerable increase over that of the period immediately preceding (1,726), but that circumstance is not especially significant, as the incidence normally increases very sharply at this season.

A more detailed analysis than could appropriately be given here suggests that while it is quite possible that the drought increased the typhoid rate rather sharply in some localities, it would be difficult upon the basis of the general statistics alone to state how much the drought had increased the typhoid rate in the United States as a whole. At best, the available information might permit the inference that if there was an increase attributable to drought it probably did not exceed 10 or 15 per cent of the incidence that might otherwise have been expected.

Meningococcus meningitis.—The epidemic wave of meningitis has in most regions apparently declined somewhat further, even if the normally expected seasonal decline is taken into consideration. Since last March the incidence has been dropping progessively further below the incidence of corresponding periods of last year. During the current 4-week period another milestone has been passed, in that the incidence for the first time dropped below a 4-week period of 1928. (During individual weeks the current incidence had already dropped below that of 1928 several times.)

While this rather slow decline may seem halting and inconclusive, in comparison with the characteristic behavior of other epidemic diseases, it should be borne in mind that it took about 11 years for the last epidemic cycle of meningitis to complete itself—that is, to pass from one low point to the crest and back again to the trough of the wave.

During the 4-week period of this report the reported cases numbered 295, as compared with 464 last year and with 300 the year before.

Diphtheria.—The favorable record of the earlier part of this year has continued during the current report period. The reports showed 2,173 cases, which marks a new low for this season of the year. Last year, which was not a high year for diphtheria, the same four weeks contributed 3,101 cases. The present report therefore represents a decline from last year of nearly a third.

Measles.—The incidence was not far from the average for this season. For the 4-week period, 7,177 cases were reported, as compared with 6,875 during the same period last year.

Scarlet fever.—This disease continues its favorable status. The number of cases reported (2,627) represents the lowest incidence for this disease during recent years. Last year 3,678 cases were reported during the period.

Smallpox.—This disease, which, during the earlier part of this year, had given cause for concern in many sections, has undergone a decline greater than the seasonal expectancy during the last period, so that toward August 1, the incidence was at approximately the average of recent years for that season. Owing to the high incidence during the July portion of the period, however, the incidence for the 4-week period as a whole was somewhat above the seasonal average. There were 1,204 cases, as compared with 1,086 for the period last year, and with 1,013 for the 1928 period.

Mortality, all causes.—The average mortality rate for large cities, as reported by the Bureau of the Census, was 11.5 per 1,000 inhabitants (annual basis). This rate was slightly higher than the rate for the same period in the two preceding years.

ELECTRON EQUILIBRIA IN BIOLOGICAL SYSTEMS

IV. An Adaptation of the Glass Electrode to the Continuous Measurement of Hydrogen Ion Concentration of the Circulating Blood

By CARL VOEGTLIN, *Chief of Division of Pharmacology*, FLOYD DEEDS, *Pharmacologist*, and H. KAHLER, *Biophysicist, National Institute of Health (formerly Hygienic Laboratory), United States Public Health Service*

In a preliminary report (Voegtlin, DeEds, Kahler, and Rosenthal, 1929) to the Thirteenth International Physiological Congress, a technique was briefly described for the simultaneous differentiation of changes in hydrogen ion concentration as measured by a glass electrode, and of those more complex changes in electron equilibria in living tissues which are manifest at a bare platinum electrode. Experiments were also reported in which a glass electrode was inserted into the blood stream for the correlation of blood and tissue pH. The technique employed was quite satisfactory for the detection of changes in potentials occurring at both types of electrodes, but was

deficient in that it did not permit us to state with assurance the true basic potentials. Further work upon the differentiation of these two types of potential has been delayed to permit development of the technique to a point where true basic values could be measured with reasonable accuracy.

It is therefore the object of this paper to describe the preparation of a satisfactory glass electrode, its application to the continuous measurement of changes in hydrogen ion concentration of the circulating blood of a dog during changing physiological state, and to produce evidence pointing to the advantages of this technique over current methods.

PREPARATION OF GLASS ELECTRODE

Two other papers (DeEds and Kahler, Kahler and DeEds (in press)) deal with certain theoretical aspects of the glass electrode, its proper calibration and operation. These papers should be consulted by anyone desiring to employ the glass electrode for the measurement of the pH of the circulating blood. This is essential, as reliable results can be expected only by the most careful technique. Accurate calibration of the electrodes and proper functioning of the vacuum-tube voltmeter are necessary requisites. We shall limit ourselves here to a description of the structural details of the electrode.

There is now fair agreement among those working with the glass electrode that a pure soda-lime glass having the composition 72 per cent SiO_2, 6 per cent CaO, and 22 per cent Na_2O will yield glass membranes having a satisfactory hydrogen ion function. Failure to obtain the satisfactory hydrogen ion function with membranes of requisite thinness and made from glass alleged to have the above composition is sufficient reason for suspecting the presence of impurities. An analysis of any glass not prepared from pure ingredients in the laboratory may often be a saving of time.[1]

A suitable size of glass tube for the preparation of the electrode is 30 centimeters in length, outside diameter 7 or 8 millimeters, and side walls 1 to 1.5 millimeters thick. This piece of tubing is heated at the center with a microburner and pulled out to form two tubes having a fairly abrupt change in bore at the end from the original diameter to a capillary. The capillary is then broken off about 0.5 to 1 centimeter from the shoulder.

The tip of the capillary is sealed in a micro-Bunsen burner during constant rotation of the tube so as to give a centrally placed accumulation of glass at the end of the capillary. The small globule of glass is then blown out to a very thin bulb. Experience will teach one the proper correlation of such factors of technique as size of capillary,

[1] A satisfactory glass (015) can be obtained from the Corning Glass Works, Corning, N. Y.

size of globule of glass, temperature of flame and pressure to be applied in blowing the bulb. When the size of the capillary and the mass of glass at the tip are correct, it will usually be found that the diameter of a bulb of requisite thinness is approximately equal to the diameter of the original tubing.

It is a good plan to prepare many bulbs and then sort out the suitable ones in the following manner: The bulbs and shanks are

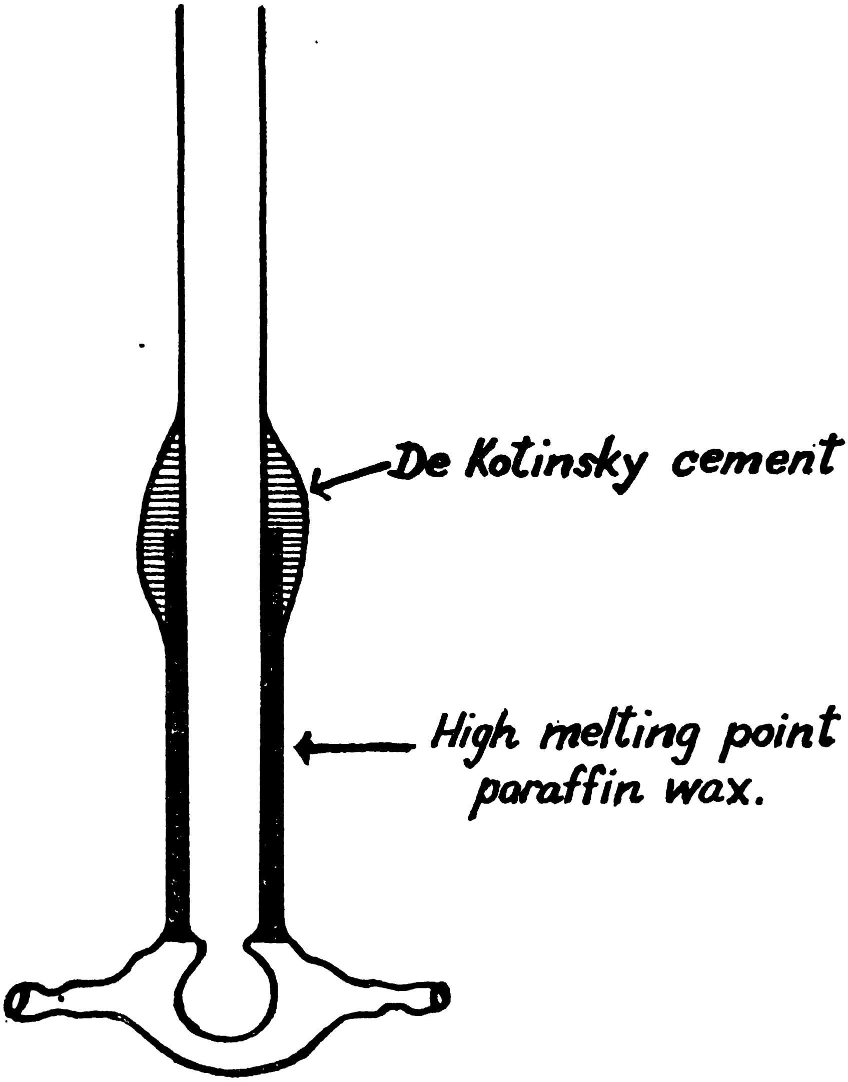

FIGURE 1.—Manner of mounting the glass electrode in the pyrex cannula

filled with water and the electrodes are laid on their sides in a shallow white enameled pan of water deep enough completely to cover the bulbs. Because of the difference in refractive indices of water and glass, the thick bulbs can readily be separated from the thin bulbs, which are barely discernible. Having sorted out the thin bulbs by the optical procedure, they are further sorted by a determination of

the electrode function with standard buffers, two buffers, such as pH 4 and 7.5, sufficing to pick out the bulbs satisfactory for the final mounting. The use of very thin (low strain) glass membranes for animal experiments is particularly desirable, as these give steady potential readings during the necessary manipulation of the physiological equipment.

The final mounting of a suitable bulb is a device designed to permit insertion of the electrode in the blood stream. Briefly it is a short-stemmed T-tube, inverted and preferably made of pyrex. Figure 1 shows the manner of mounting the glass electrode in the pyrex cannula. The horizontal arms of the inverted T-tube are slightly constricted near the ends to permit tying securely into the blood vessel.

The bulb type of electrode is preferred to the type described by MacInnes and Dole (1930) for the type of work being pursued here, because of its ruggedness. When mounted as here described and used in the circulating blood it withstands large and sudden changes in blood pressure. The electrode described by MacInnes could be mounted in a similar manner, but any rupture of the membrane due to blood pressure would cause troublesome hemorrhage and delay.

BEHAVIOR OF GLASS ELECTRODES IN THE PHYSICAL SYSTEM

Since the plan of the experiments dealing with circulating blood called for the placement of an electrode in each carotid artery for purposes of checking the reliability of the method, it seemed advisable to study the simultaneous behavior of two electrodes in a physical system. For this purpose two electrodes carefully calibrated at 37° C. were connected by small bore rubber tubing, simulating artery, to a 2-way stopcock which in turn was connected by glass tubing to two one-liter bottles containing buffer solutions of known pH. These buffers were heated to 40° C. so that the temperature at the glass electrodes was 37° C. The electrode potentials were measured simultaneously with two vacuum-tube voltmeters (Kahler, DeEds, Rosenthal and Voegtlin, 1929). This technique made it possible to study the potential of a given buffer with varying rates of flow, to determine the error between the two electrodes, and to note the lag when turning off the stopcock changed the flowing buffer from one pH to another. The following facts were clearly established:

1. Two carefully calibrated glass electrodes agree within 0.02 pH to 0.03 pH, on steady flows, and over short-time periods are capable of detecting pH changes of a much smaller magnitude.
2. Change in rate of flow of a given buffer is without effect on the potential.
3. Lag is dependent upon flow when changing from one pH buffer to another. With rates comparable to blood flow in the carotid artery of a dog the lag is negligible.

pH OF CIRCULATING BLOOD OF DOG

To establish the reliability of the glass electrode, in view of the above facts, for the continuous measurement of the pH of the circulating blood it remained to place an electrode in each carotid artery and follow the magnitude of the potentials during a control period of light anæsthesia (see later discussion) and then note the changes produced by rebreathing, hyperventilation, asphyxia, and deep ether anæsthesia.

The glass electrodes were carefully calibrated at body temperature before insertion into the blood vessels. They were filled with a phosphate buffer of pH 7. As an additional safeguard of the proper functioning of the vacuum-tube voltmeter and the glass electrode within the blood stream, the grid bias was checked under constant physiological conditions by reversing the poles of a given glass electrode,

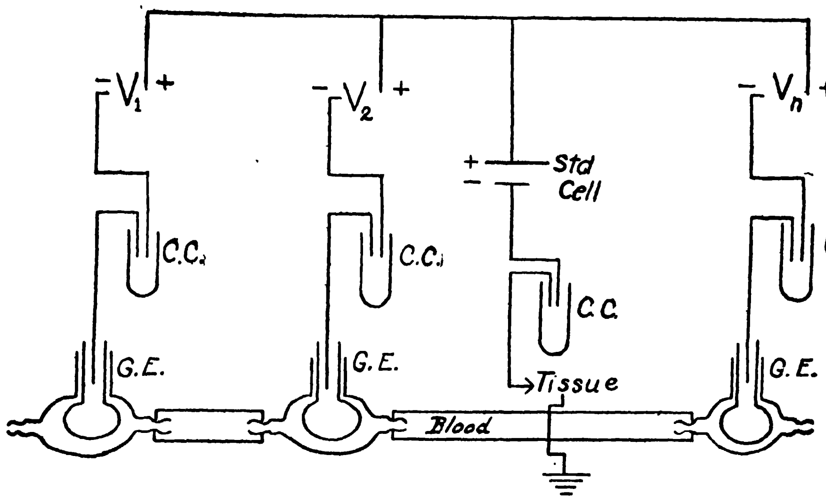

FIGURE 2.—Diagrammatic illustration of multiple connections of several glass electrodes. V_1, V_2, and V_n=static voltmeters. C. C.=saturated calomel half cells. G. E.=glass cells inserted in cannula. Std.=standard cell. The animal is grounded

disconnected from the other electrode. This check is made at the beginning and end of each animal experiment.

Morphine-ether anæsthesia was used. After insertion of a tracheal cannula and with exposure of both carotid arteries, the dog was given heparin intravenously through the femoral vein, the dosage being calculated on the assumption that the blood volume was 10 per cent of the body weight, and 1 milligram heparin being used for each 5 cubic centimeters of blood. It is very important to use sufficient heparin so as to prevent the formation of fibrin deposits on the glass electrode. Bull dog clips were then placed on the carotids first peripherally and then centrally. After the mounting of the glass electrode had been filled with 0.85 per cent NaCl, one cannulated end was tied into the central portion of a carotid peripheral to the clip. The

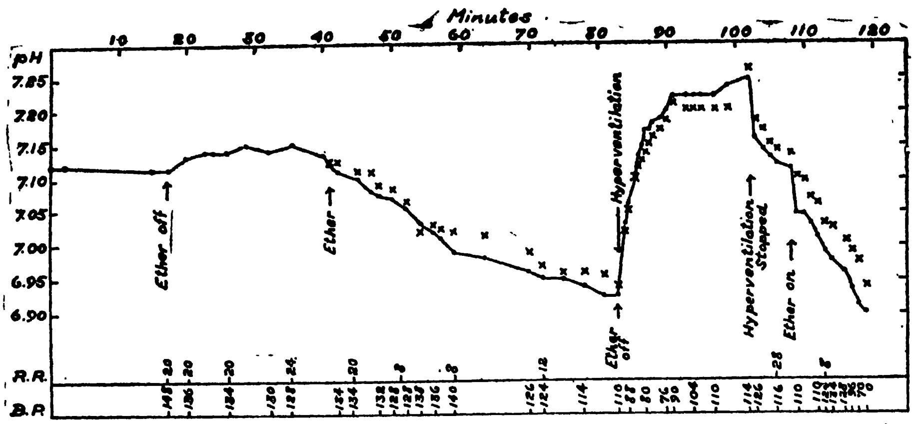

FIGURE 3.—Dog; 14.5 kg. Six c. c. 4 per cent morphine sulphate s. c.; light ether anesthesia. Heparin 350 mg. intravenously. Glass electrode No. 61 inserted into right carotid artery (pH indicated by graph); glass electrode No. 68 in left carotid (pH indicated by x x). R. R. = respiratory rate; B. P. = mean arterial blood pressure in femoral artery. Note slight drift toward more alkaline pH when ether is discontinued. The ether was again given and pushed to the limit compatible with life. There was a gradual drift toward a lower pH, and when pH 6.926 was reached, the ether was discontinued and vigorous artificial respiration was instituted. The blood showed an immediate drift toward alkalinity; and when pH 7.25 was reached, the artificial respiration was stopped, and immediately there was an abrupt decrease in pH. The dog was finally killed by ether; the pH at the time of death was 6.92. Examination of the two glass electrode cannulas revealed no sign of blood coagulation

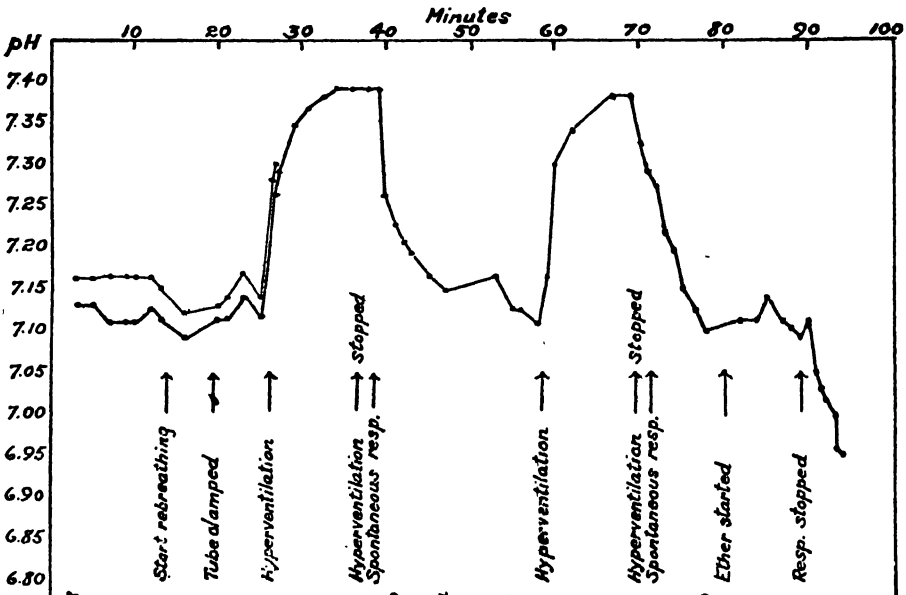

FIGURE 4.—Dog; 11 kg. Five c. c. 4 per cent morphine sulphate s. c.; light ether anesthesia during preliminary surgical operation. Heparin intravenously. Glass electrode No. 61 in right carotid artery (heavy line); glass electrode No. 66 in left carotid artery (light line). Moderate rebreathing by attaching a rubber tube to trachael cannula produced a slight increase in the hydrogen ion concentration of the blood. There was a sudden and considerable drift toward alkalinity with the institution of vigorous artificial respiration. Cessation of artificial respiration was followed by a short apnea; resumption of spontaneous respiration accompanied by a drift toward the pH range at the beginning of the experiment. The hyperventilation effect was obtained the second time. The animal was finally killed with ether. The last reading of pH was 6.95. Unfortunately the flow of blood through the cannula of electrode No. 66 stopped at the end of 27 minutes and further readings were made impossible. Up to that time, however, the two electrodes gave very close potential values

other cannulated end was then tied into the peripheral part of the artery. With the electrode in place, the two clips were removed simultaneously and blood flow was established past the electrode membrane. The vertical shank of the electrode was held in place by one arm of the KCl agar bridge dipping into the buffer solution contained in the glass bulb and shank, the other arm dipping into a saturated calomel electrode. The second electrode was similarly placed in the second carotid artery. The circuit was closed by

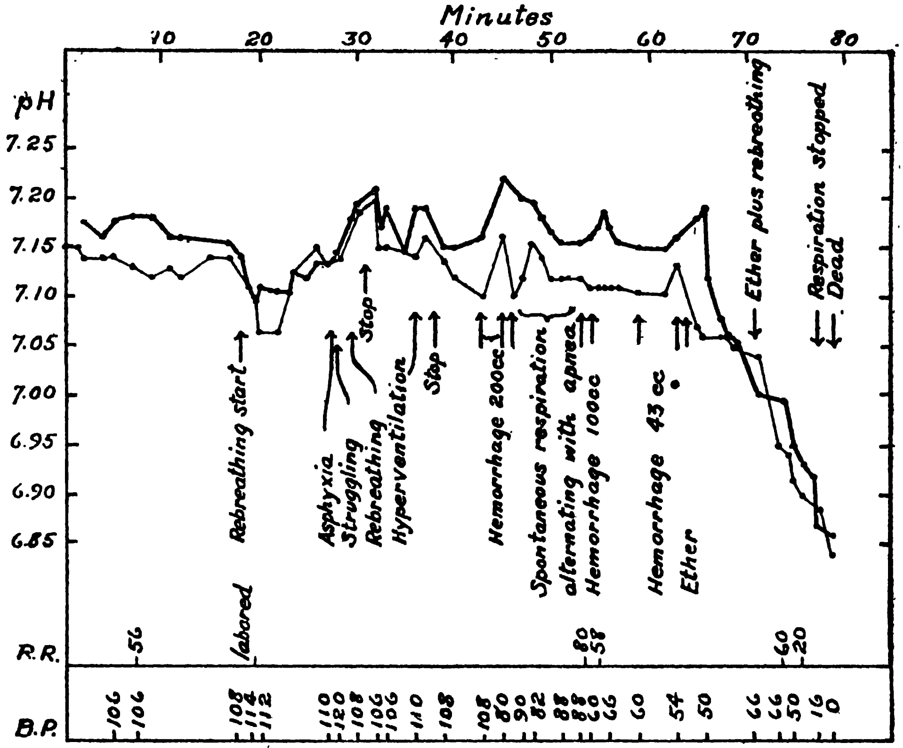

FIGURE 5.—Dog; 12.3 kg. Three c. c. 4 per cent morphine sulphate s. c.; light ether anesthesia during operation. Heparin 100 mg. intravenously. Glass electrode No. 69 in carotid artery (heavy line); glass electrode No. 61 in external jugular vein (light line). Note that venous blood, as a rule, is more acid than the arterial blood, with the exception of periods of asphyxia, when the pH values tend to approach each other. Registration of potentials by an oscillograph would undoubtedly have given a better potential-time relation. The pH of the blood fluctuated within relatively narrow limits in spite of rebreathing and hemorrhage. The blood at the time of death was slightly more acid than was the case in the experiments illustrated by Figures 3 and 4

placing one end of a third KCl agar bridge on a moistened portion of the body of the dog, the other end making contact with a calomel cell. The electrical connections are shown diagrammatically in Figure 2. The voltage was read directly on the potentiometer at certain time intervals. In order to obtain more accurate time-potential relations, use may be made of an oscillograph as described in the preceding papers of this series.

Figures 3–5 illustrate some of the results obtained. Figure 4 shows the good agreement of the electrodes until stoppage of flow

occurred in electrode No. 66. Figure 3 also shows good agreement of the two electrodes. Figure 5 is introduced merely to show the feasibility of the method for the simultaneous study of arterial and venous blood. It is seen from Figures 3 and 4 that the potentials of the two electrodes placed in the carotid arteries agree quite well within the range of error determined on the physical system. The sudden drift toward alkalinity resulting from hyperventilation is further proof of the satisfactory functioning of the electrodes. As one works with this technique it is surprising to note the precision with which two electrodes will consistently follow changes of a few tenths of a millivolt, as when a deep breath is taken or such changes as occur during the progressive increase in acidity with increase in depth of anæsthesia.

It is not the purpose of this paper to determine the pH of blood in the normal unanæsthetized dog, but rather to describe a useful method for the determination of the pH under stated conditions. However, the results obtained suggest that when a glass electrode in the circulating blood reveals a change from 7.14 under morphine to 6.98 at death from ether anæsthesia, it seems unlikely that the value 7.14 represents very much of a depression caused by morphine from a more alkaline value.[2] Moreover, the attempt to secure an idea of the "normal" pH is fraught with difficulty, because blood removed by cardiac puncture or otherwise from a dog untrained for the purpose results in struggling and change in respiration. It would therefore be difficult to say that such a sample represented normal blood.

The lowest pH values of the arterial blood observed at the time when the animals died from ether ranged from 6.95 to 6.91. When death was caused in one experiment by combining rebreathing and ether, the lowest value was 6.85. These values are slightly lower than those mentioned by Van Slyke (1921) who states that "under extreme abnormal conditions the pH may fall as low as 6.95; but before this point is reached it appears that coma occurs, and, from the fact that lower pH values have not been observed, it is doubtful that further decrease is compatible with life."

COMPARISON WITH MANGANESE DIOXIDE ELECTRODE

Previous methods for the continuous measurement of pH in circulating blood involve the use of the manganese dioxide (Gesell and Hertzmann, 1926) or antimony electrode (Buijtendijk, 1927). Since the antimony electrode makes use of an oxide, it would seem to be subject to the same difficulties which we have found to exist for the manganese dioxide electrode. Previous workers (Gollwitzer-Meier

[2] Wallace and Pellini (1921) found no decrease in alkali reserve following the administration of large doses of morphine to dogs.

and Steinhausen, 1928) including Hertzmann and Gesell (1927) have discussed the effect of variation in rate of flow upon the potential of the manganese dioxide electrode. They also admit that the presence of oxidizing or reducing substances in the blood may lead to erroneous values. We have therefore compared the manganese dioxide electrode with the glass electrode with respect to the effect of flow, and in addition we have considered the question of the possible influence of the presence of oxidizing and reducing substances which might occur in the blood stream as the result of hemolysis (liberation of SH-glutathione, etc.) or as the result of waste materials being carried away from the tissues. The effects of M/1,000 cystein hydrochloride and M/1,000 crystalline SH-glutathione on the potential of glass and manganese dioxide electrodes are shown in Table 1. Similar results were obtained by the addition to the phosphate buffer of a solution of equal parts of M/1,000 potassium ferri and ferro cyanide.

TABLE 1.—*Effect of the addition of either cystein or SH-glutathione to phosphate buffer on the potential at the MnO_2 electrode and a glass electrode. The former electrode, freshly prepared according to Gesell and Hertzmann, and the glass electrode were inserted into phosphate buffer of 7.51. Same buffer on inside of glass cell*

Time	Glass volts	MnO_2 volts	Time	Glass volts	MnO_2 volts
11.40	1.0184	0.425	1.36	1.0136	0.458
			1.45	1.0131	.457
			1.49	1.0131	.456
20 c. c. M/1000 cystein HCl added to 50 c. c. of buffer.			20 c. c. M/1000 SH-glutathione added to 50 c. c. of buffer.		
11.42	1.0195	.383			
11.43	1.0190	.365			
11.44	1.0190	.353	1.52	1.0131	.419
11.45	1.0190	.346	1.53	1.0131	.431
11.50	1.0190	.319	1.54	1.0131	.424
11.55	1.0189	.300	2.00	1.0131	.402
12.00	1.0180	.284			

NOTE.—The values given for the glass electrode include the voltage of the standard cell and the strain of the glass cell.

The absence of an effect of flow on the glass electrode has already been pointed out, but additional evidence is shown in Table 2, where the effect of flow on the manganese dioxide electrode is clearly shown. In this experiment the MnO_2 electrode gave a fairly steady potential, as long as the blood remained quiescent. After the addition of the rat liver extract to the blood, however, flowing of the mixture past the electrode invariably produced a gradually shifting potential. Similar results were obtained with partially hemolyzed blood.

TABLE 2.—*Effect of rate of flow and addition of 10 per cent saline liver extract upon the potentials of the glass and MnO_2 electrode immersed in fresh oxalated horseblood*

Time	Glass m. v.	Remarks	MnO_2 m. v.	Time	Glass m. v.	Remarks	MnO_2 m. v.
	190.7	Quiet	317	1.41	(1)	Quiet	302.9
	190.7	do	315	1.42	(1)	do	302.3
	190.7	do	315	1.42½	(1)	Flowing	300.5
	190.7	Flowing	317	1.44	(1)	do	298.3
	190.7		315	1.45	(1)	do	293.5
	190.7		315	1.47	(1)	do	292.3
1.19		Liver extr. added	310	1.47½	(1)	Quiet	291.2
1.21		Flowing	307.5	1.49	(1)	do	291.2
1.22		do	305	1.50	(1)	do	292.0
1.27	190.3	Quiet		1.52	(1)	do	292.5
1.30	192.8	Flowing		1.53	(1)	Flowing	292.5
1.30½	194.2	Quiet		1.53½	(1)	do	2.1.0
1.33		do	302.2	1.54	(1)	do	230.2
1.35		do	302.2	1.55	(1)	do	289.0
1.37		do	302.9	1.56	(1)	do	287.7
1.39		do	302.9				

[1] Value remained unchanged.

From a chemical standpoint it is not at all surprising that such substances as cystein, SH-glutathione, etc., should interfere with the proper functioning of the MnO_2 electrode, as MnO_2 is a very effective oxidizing agent for these and many other organic substances. The electrode under these conditions is no longer an "unattackable" electrode, and continuous drifts, such as have been described, find their rational explanation.

The independence of the glass electrode from variation in rate of flow and the presence of oxidizable organic substances is the strongest possible argument in favor of selecting this electrode for the measurement of the pH of the circulating blood under all sorts of conditions. The same advantages obtain in the use of the glass electrode for the continuous measurement of the pH of tissues in situ.

CONCLUSIONS

The construction of a suitable glass electrode for measuring the pH of the circulating blood has been described, its reliability for following the pH changes accompanying changes in physiological conditions has been demonstrated, and its great advantages as compared with the manganese dioxide electrode have been shown.

It is believed that the application of this technique will make possible a better investigation of numerous problems related to pH of the blood of the living animal. The method permits continuous observation and, if desired, allows recording of the values on an oscillograph, because of the power output of the vacuum-tube voltmeter. The method posseses the advantage of being uncomplicated by flow effects, presence of oxidizing or reducing substances, and permits the measurement of pH values under conditions eliminating errors due to loss of carbon dioxide.

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THE UNITED STATES PUBLIC HEALTH SERVICE AS A CAREER

Information for Persons Desiring to Enter the Regular Commissioned Corps

Within recent years the opportunities for useful medical and public health work, including scientific research, in the United States Public Health Service have greatly increased. This work is carried on largely by medical, dental, and public health engineer officers appointed for permanent duty by the President by and with the advice and consent of the Senate. Recent laws have definitely fixed their compensation, rate of promotion, and conditions of retirement. In consequence, this service offers an attractive professional career to young men of ability, energy, and judgment.

For the information of persons who possess these attributes and may be interested in such a career, there are presented here some brief statements regarding the history, functions, and organization of the United States Public Health Service and also regarding appointments, compensation, promotions, individual duties, and retirement of officers in case of permanent disability.

Historical Note

The United States Public Health Service was authorized by act of Congress approved July 16, 1798, and known until 1902 as the Marine Hospital Service. Created originally to provide medical care and treatment to sick and disabled seamen, its functions were extended by successive acts of Congress to include many other highly important duties and responsibilities, including scientific research and measures for the protection of the public health.

From time to time since 1798 the classes of medical beneficiaries of the Public Health Service have been increased. In 1878 its quarantine

duties were begun, and by 1906 the Federal quarantine system had become nationwide. In 1891 the service was charged with the medical examination of arriving aliens, which function has been continued and extended to include the medical examinations in foreign countries of intending immigrants destined to the United States.

Coincident with the medical care of beneficiaries, the prevention of diseases, and the control of epidemics, special studies of public-health problems were required. The most important in early days related to exotic diseases. In 1901 the construction of the Hygienic Laboratory was authorized by law for the systematic investigation of contagious and infectious diseases and matters pertaining to the public health. In 1902 the service was charged with the regulation of the introduction and sale in interstate traffic of viruses, serums, toxins, and analogous products. In 1912 basic authority was granted for field investigations of health problems, including sanitation and sewage and the pollution of navigable waters. In 1918 special authority was granted for investigations and control of venereal diseases. In 1929 the service was charged with studies of drug addiction and the care and rehabilitation of drug addicts. In 1930 laws were enacted for broad studies of mental hygiene, for cooperation with other departments and independent establishments of the Government in public-health activities, and for the establishment in an enlarged Institute of Health to be devoted to scientific research of problems of diseases of man and matters pertaining to the public health.

In addition to the above basic laws providing for the evolutionary growth of the service, numerous laws have been enacted from time to time requiring specific studies of diseases and public-health problems, and regulatory measures adopted to correct insanitary conditions coming within the purview of the Federal Government. In the aggregate these laws grant broad authority for medical and health activities. They legalize the policy of cooperation with other Federal agencies and with State and local health authorities in their measures for the prevention of the disease and the promotion of the public health. They provide also for the organization of the service and the status of its officers. By the act of January 4, 1889, officers are commissioned in grades similar to those of the Medical Corps of the United States Army.

Functions

All of the functions of the Public Health Service have direct or indirect bearing on the protection of health and the promotion of economic welfare. The medical care and treatment, which prior to 1811 was accorded all seamen engaged in the care or preservation of any American vessel, including naval vessels, has been extended from time to time. At present the list of beneficiaries is as follows:

1. American seamen employed on board in the care, preservation, or navigation of any registered, enrolled, or licensed vessel of the United States.

2. Officers and enlisted men of the Coast Guard.

3. Officers and seamen on vessels of the Coast and Geodetic Survey.

4. Officers and crews of vessels, certain keepers and assistant keepers of the Lighthouse Service.

5. Officers and crews of vessels of the Bureau of Fisheries.

6. Immigrants detained at immigration stations.

7. Seamen from vessels of the Army Engineer Corps and other vessels belonging to the United States Army.

8. Seamen employed on vessels of the Mississippi River Commission.

9. Beneficiaries of the United States Employees' Compensation Commission.

10. Patients of the Veterans' Bureau.

11. Lepers.

12. Officers of the Public Health Service and employees on field duty.

13. Prisoners at United States penal and correctional institutions.

14. Patients at Federal narcotic farms.

Almost a half million persons apply annually for care and treatment, including physical examinations, at hospitals or other relief stations maintained by the service at 155 ports of the United States and its possessions. Among these patients practically every class of disease is represented. In their care and treatment, knowledge of all the medical and dental specialties is constantly requisitioned.

In the 25 marine hospitals operated by the Public Health Service more than 300 doctors and dentists, over 400 nurses, aides, and dietitians, and approximately 1,800 other persons are constantly employed in the care of a daily average of about 4,000 patients. The annual expenditures in the marine hospitals and other relief stations are more than $5,000,000. The marine hospitals are all general medical and surgical hospitals except the hospital at Carville, La. (National Home for Lepers), which is devoted to lepers, and the hospital at Fort Stanton, N. Mex., to which merchant seamen and other beneficiaries with tuberculosis, suitable for treatment in a high altitude, are transferred. The Marine Hospital at Ellis Island, while primarily designed for detained immigrants, is also used for regular service beneficiaries, and all the marine hospitals admit patients of the Veterans' Bureau when facilities permit. New marine hospitals have recently been completed at Detroit and Cleveland, others are in process of construction at San Francisco (500 beds), Galveston, and New Orleans (600 beds), and new marine hospitals have been authorized in New York (600 beds), Baltimore, and Seattle. The building program is necessary to keep

pace with the development of the American merchant marine and to fulfill other obligations of the Government to provide hospital treatment.

The quarantine activities are conducted at all the important ports of the United States and its possessions. In addition, medical officers are assigned to duty at American consulates at many foreign ports throughout the world for the purpose of furnishing information and taking necessary measures under the law for the prevention of the introduction of communicable diseases into the United States.

In order to advise immigration and consular officers as to the physical and mental condition of aliens destined to the United States, medical examinations of these persons are conducted at 136 ports in the United States and its dependencies and in Canada. Like examinations of intending immigrants are conducted at 35 important centers throughout Europe, Canada, and Mexico.

For the prevention of the spread of communicable diseases from one State to another and the control of epidemics, numerous field surveys and laboratory studies are necessarily conducted. Several small hospitals and a field laboratory are maintained for the eradication of trachoma. The matter of prevention and treatment of leprosy receives special attention in Hawaii and the United States. The sanitation of water supplies used for drinking and culinary purposes on interstate trains and vessels is supervised. Special studies are made of water, sewage, and ventilation, and control measures are maintained for the sanitation of shellfish-bearing areas. Sanitary work is conducted by public-health engineers and others in public institutions, national parks, and Indian reservations. In cooperation with State and local health authorities full-time health agencies are maintained in many counties throughout the country.

At various clinics, systematic investigations are made of the treatment and methods of control of venereal diseases, and cooperation is had with State and local health authorities in the development and maintenance of control measures. The dissemination of information regarding this group of diseases is also an important duty of the Public Health Service.

In conformity with recent law, special studies of mental hygiene are being organized, "farms" are to be established for studies of drug addiction and the care and rehabilitation of drug addicts, and the medical care of inmates of Federal penal and correctional institutions is being undertaken.

Fundamental research of public-health problems in laboratories and in the field constitutes perhaps the most important function of the service. In this field great advances may be made and signal opportunities are afforded to officers qualified for such work.

Organization

The Public Health Service is under the Treasury Department. It is presided over by the Surgeon General, whose acts are subject only to the general supervision and approval of the Secretary of the Treasury and the President of the United States. All activities are conducted through the central headquarters, the office of the Surgeon General, located at Washington. This office has eight divisions, each in charge of an Assistant Surgeon General, as follows:

1. Marine hospitals and relief.
2. Domestic (interstate) quarantine.
3. Foreign and insular quarantine.
4. Sanitary reports and statistics.
5. Scientific research.
6. Venereal diseases.
7. Mental hygiene.
8. Personnel and accounts.

The activities of the above-named divisions in the field are conducted by stations and laboratories located at many points throughout the United States and its possessions, and in foreign countries. Medical and dental work is carried on at 155 relief stations, including the marine hospitals.

Quarantine stations are located at all important maritime and border ports in the United States. The interstate sanitary activities are conducted through control stations and laboratories, and in cooperation with other Federal departments and independent establishments and State and local health authorities throughout the country. Activities relating to venereal disease are carried on through special clinics, and by means of special surveys and publications.

The division of sanitary reports and statistics collects and publishes public health information received from all public health stations of the service, consular offices throughout the world, and State and local health authorities of the United States and its possessions. The dissemination of information regarding health matters is an important function of the service. It is carried on by means of publications, exhibits, lectures, radio broadcasts, and demonstrations.

Account is taken of problems of mental hygiene at special stations of the service, at penal institutions and elsewhere. Narcotics farms will provide important facilities for studies conducted by the division of mental hygiene.

The division of scientific research supervises laboratory and field investigations of diseases of man and matters pertaining to the public health wherever required. Facilities for the bulk of this work are provided for in the National Institute of Health, Washington, D. C., which has a highly qualified scientific staff. Studies of pollution of

navigable streams, including water and sewage, are carried on in a permanent water and sewage experimental laboratory at Cincinnati, Ohio. Field parties and laboratories are organized as necessary for studies of malaria, pellagra, Rocky Mountain spotted fever, and other diseases of man, and for investigations of child hygiene, industrial sanitation, and similar public health problems. The organization for such work is expanding, and such investigations offer an excellent field for persons having research ability.

All matters relating to personnel and accounts in Washington as well as in the field are under supervision of the division of personnel and accounts. These include appointments, promotions, discipline, official assignments, transfers, leaves of absence, resignations, retirements, and accounts, including pay and allowances of all officers and employees of the service and all of the accounting work connected with the expenditures of public funds appropriated by the Congress for the use of the service.

Appointments to the Commissioned Corps

The regular commissioned corps of the United States Public Health Service includes medical, dental, public health engineer, and pharmacist officers appointed by the President by and with the advice and consent of the Senate. Depending on efficiency, appointments are permanent.

Prior to appointment each candidate must pass an examination before a board of regular commissioned officers. Original appointments are made in the grade of assistant surgeon. In exceptional instances only may original appointments be made to the next higher grade, and the candidate must then have had specialized training and experience prescribed by regulation. Appointments are made to fill vacancies as they occur on selection by the Surgeon General from among successful candidates, their selection being based on seniority as determined by relative standing on the merit roll reported by the Board of Examiners.

Graduates in medicine, dentistry, public-health engineering, or pharmacy desirous of undergoing examination for appointment must make application to the Surgeon General of the United States Public Health Service in their own handwriting requesting permission to appear before the board. Applicants must state their age, date and place of birth, present legal address, whether a citizen of the United States, the name of the professional school or college of which they are graduates, and must furnish a recent photograph and at least two testimonials as to their professional and moral character. Applicants of foreign birth must furnish proof of United States citizenship.

No applicant is eligible to appear before a board of examiners for appointment in the grade of assistant surgeon whose age is less than

23 years or more than 32 years. The applicant must have had at least seven years of educational and professional training, or experience equivalent thereto; four years of which shall have been spent in a professional school granting a degree of medicine, dentistry, public-health engineering, or pharmacy.

An applicant for appointment in the grade of passed assistant surgeon may not be over 39 years of age, and must have had the educational and professional training, or experience equivalent thereto, required for the grade of assistant surgeon, and in addition two years' postgraduate instruction, research, or teaching in some specialized branch of medicine, dentistry, sanitary engineering, or pharmacy, and at least two years' practice in his specialty.

The examination consists of a thorough physical examination and tests to determine the applicant's educational and professional knowledge and general fitness to perform the duties of an officer of the service. Physical soundness is a prerequisite to appointment. The educational test is intended to bring out the candidate's scholastic training and knowledge of current events. The general fitness test is conducted so as to determine general intelligence, judgment, force, initiative, tact, and like qualifications needed by any person to be successful in his chosen calling. The professional test is largely in writing in the several subjects of medicine, dentistry, public-health engineering, or pharmacy as the case may be. The medical subjects are as follows: (1) Anatomy, (2) physiology, (3) chemistry, (4) materia medica and therapeutics, (5) practice of medicine, (6) practice of surgery, (7) obstetrics and gynecology, (8) hygiene, (9) pathology and bacteriology, and (10) reports on selected cases at a hospital. The dental subjects are the following: (1) Anatomy, (2) physiology, (3) chemistry and metallurgy, (4) pathology and bacteriology, (5) materia medica, (6) oral surgery, (7) hygiene and radiology, (8) operative dentistry, (9) prosthetic dentistry, and (10) clinical and laboratory. Following are the public-health engineering subjects: (1) Chemistry, (2) bacteriology and planktology, (3) mathematics, (4) physics, (5) hydraulics, (8) water and sewage treatment, (9) sanitary science and public health, (10) practical problems and laboratory demonstrations. The pharmacy subjects are as follows: (1) Chemistry, (2) practice of pharmacy, (3) materia medica, including pharmacodynamics, (4) pharmacognosy, (5) physics, (6) toxicology, (7) food and drug analysis, (8) physiology and hygiene, (9) business management, including accounting, (10) practical dispensing and laboratory procedures.

The maximum grade in any one subject in an examination for appointment is 100. The minimum grade in the academic and oral professional tests is 70, and in the aggregate written professional and the general fitness tests is 80. The academic, professional, and

general fitness tests have the following relative values in determining the final grade:

(a) Academic	10
(b) Written professional	50
(c) Oral professional	15
(d) General fitness	25
	100

By the above system of ratings a candidate is expected to make an average of 80 in the written professional test. While he may make a low grade in one or more of the written subjects, this can be more than made up by high grades in one or more of the remaining subjects, thereby attaining the minimum average of 80. A candidate is expected, of course, to make the passing grade of 80 in general fitness.

The character of the examination is such that graduates of class A medical schools and schools of dentistry, public-health engineering, and pharmacy of like standing should have no difficulty in passing the professional test. No catch questions are asked, the object being to bring out by means of well-balanced questions the candidate's professional knowledge and ability to apply it.

Candidates in medicine who have passed the tests of the National Board of Medical Examiners are given credit of passing the written professional test required in the examination for appointment to the grade of assistant surgeon. They must appear, however, before the board of medical examiners for the physical examination and the other tests prescribed by law and regulations. Examinations are held at intervals in various large cities of the United States. No allowance is made for expenses of candidates appearing for examination.

Successful candidates receiving appointments in the grade of assistant surgeon are designated, respectively, assistant surgeon, assistant dental surgeon, assistant sanitary engineer, or assistant pharmacist, as the case may be.

Assignments to Duty

With the exception of assistant sanitary engineers, officers on receiving their appointment are usually detailed for duty first at a hospital station; assistant sanitary engineers are detailed for duty at field stations or laboratories dealing with sanitary engineering problems. Commissioned officers are not appointed to any particular station, but are subject to change of station as the exigencies of the service may require. They are required before appointment to certify that they are willing and able to serve in any climate where assigned to duty.

During the first few years of service, officers may be assigned successively to a marine hospital, a quarantine station, an immigration station, to the National Institute of Health, to field public-health

work, and to educational and research institutions for special studies of scientific problems relating to public health. The length of duty at a particular station depends on previous training, public exigency, and, within limits, the predilection of the officer for a particular kind of work.

It is necessary that officers accept their assignments willingly and endeavor to profit by their experiences professionally and socially. The opportunities for travel both in the United States and abroad greatly enlarge the knowledge and experience of officers. Officers in the junior grades serve under experienced officers in charge of the larger stations. With the acquisition of knowledge and experience and advance in grade, officers are assigned to more responsible duties, and when thoroughly fitted to assume responsibility they are placed in charge of important activities. The character of assignments depends on an officer's qualifications, including energy, experience, judgment, professional skill, and dependability.

Promotion

Officers in the several grades are eligible for examination for promotion as follows:

1. Assistant surgeon, assistant dental surgeon, and assistant sanitary engineer to the grade of passed assistant surgeon upon the expiration of three years' regular commissioned service, and assistant pharmacist to such grade upon the expiration of five years' regular commissioned service.

In order to be promoted, an officer in the grade of assistant surgeon must satisfy the Board of Examiners that he has been diligent in the performance of his duties and in keeping himself informed of the practice of his profession since his appointment into the service, and that he is able to perform the duties of a higher grade. Should an officer in the grade of assistant surgeon be found not qualified for promotion for reasons other than physical disability incurred in line of duty, his commission will be terminated by the President, and in accordance with law he will be paid six months' pay and allowances.

2. Passed assistant surgeon, passed assistant dental surgeon, and passed assistant sanitary engineer to the grade of surgeon upon the expiration of 12 years' service from the date of original commission in the regular service.

In determining the 12 years of service required for promotion, an officer originally appointed in the grade of passed assistant surgeon shall be credited with three years' service as a part of the 12 years' requirement.

Officers in this grade are required to pass a satisfactory examination in (*a*) service record, (*b*) general fitness, and (*c*) certain professional subjects relating to their profession, including station manage-

ment and service regulations. When an officer in the grade of passed assistant surgeon is found not qualified for promotion by reasons other than physical disability incurred in line of duty, his commission will be terminated by the President, and in accordance with the law he will be paid one year's pay and allowances.

3. Surgeon, dental surgeon, and sanitary engineer to the grade of senior surgeon upon completion of 20 years' active service from the date of original appointment.

In determining the 20 years of service for promotion, an officer originally appointed in the grade above that of assistant surgeon shall be credited with the service of the junior officer in the grade to which originally appointed. If the actual service of such officer in the Public Health Service exceeds that of the junior officer in the grade, such actual service not to exceed 10 years for the grade of passed assistant surgeon and 14 years for the grade of surgeon shall be credited. Promotions are made subject to physical examination, review of the officer's record, and determination of his ability to discharge his assigned duties and the duties of the higher grade.

4. Senior surgeon, senior dental surgeon, senior sanitary engineer to the grade of medical director upon completion of 26 years' active service from the date of original appointment.

An officer in the grade of senior surgeon originally appointed to the regular corps above that of assistant surgeon shall be entitled to promotion to the grade of medical director after six years' service in the grade of senior surgeon. Promotion in this grade of any candidate shall be subject to physical examination, review of the officer's record, and determination of his ability to discharge his assigned duties and the duties of the higher grade. When an officer in the grade of surgeon or senior surgeon after examination is found not qualified for promotion by reasons other than physical disability incurred in line of duty, he may be reported as "not in line of promotion," or retired.

By the above described system, an efficient officer is assured of promotions at regular intervals through his service life. Officers selected by the Surgeon General for assignment in charge of the several divisions of the bureau are known as Assistant Surgeon General and have the rank of medical director while so serving. The Surgeon General is selected by the President from among the officers of the regular corps for appointment.

Pay and Allowances

The total annual compensation, including pay and allowances of officers in the several grades, is determined by length of service and whether or not he has dependents. Independent of promotion, all officers receive as part of their total compensation increases of 5 per

cent of the base pay for each three years of service up to 50 per cent. The maximum annual pay and allowances of regular commissioned officers under present provisions of law are as follows:

Grade	With dependents	Without dependents
Surgeon General	$9,700	$9,179
Assistant Surgeon General or Medical Director	7,200	7,179
Senior Surgeon	6,997	6,079
Surgeon	5,757	4,839
Passed Assistant Surgeon	4,158	3,699
Assistant Surgeon	3,158	2,699

Officers when taken sick or injured in line of duty are entitled to medical care and relief. Most stations are supplied with medical books, periodicals, and instruments. There is, therefore, no necessity for the purchase of these materials. Officers are obliged, however, to own and keep in good condition the uniforms of the service prescribed by regulations.

While traveling on official duty, officers are allowed 8 cents a mile; under special orders they may receive in lieu thereof actual and necessary expenses for transportation and a per diem of $6 for subsistence. On permanent changes of station, officers are entitled to transportation for their dependents; dependents as defined by law are a lawful wife and unmarried children under 21 years of age and a mother, provided she is in fact dependent on the officer for her chief support.

On permanent changes of station, officers are also entitled to transportation of their household effects in amounts as follows for the several grades:

Grade:	Pounds
Assistant Surgeon	7,500
Passed Assistant Surgeon	8,500
Surgeon	9,500
Senior Surgeon	9,500
Medical Director	11,000

Leaves of Absence

An officer is entitled to one month annual leave during each year. If not taken it may accumulate to the amount of four months. An officer is also granted sick leave when taken sick or disabled in line of duty. Should he become unable to perform his duties by reason of disease or accident (not of a temporary nature and not the result of dissipating habits), he is, after the expiration of his annual and sick leave, retired and placed on permanent "waiting orders" status. Officers so placed by reason of disability receive three-fourths of their base pay and longevity increase. By means of exercise and recrea-

tion, officers are expected to keep themselves in good physical condition.

Retirement

As above stated, officers who become permanently disabled and unable to perform their duties are retired on three-fourths of their base pay and longevity. Officers in the grade of surgeon or above who fail of promotion by reasons other than physical disability incurred in line of duty if retired are paid annually at the rate of 2½ per cent for each complete year of active commissioned service in the Public Health Service, not to exceed 60 per cent of active-duty pay at the time of retirement. Officers continued on duty as "not in line of promotion" continue to receive the active-duty pay of their grade. The provision for retirement of officers in case of disability affords valuable protection throughout their service life.

Public Health Service as a Career

By reason of the character of the duties and the conditions under which they are performed, the Public Health Service offers an attractive career. Persons with good basic training, and the ability and willingness to work, may make a success which will reflect credit upon themselves and be of lasting benefit to their country. While the pay and allowances are moderate as compared with some of those in private life, this may be more than compensated for by the opportunities offered for travel, specialization, and research, and the safeguards provided in case of permanent disability. However, a commission in the Public Health Service is not a sinecure, on account of the lack of a fixed dwelling place, the separation at times from the family, and the conditions at times of emergency field service.

No officer may expect to amass great wealth through the pay of his commission, but he is assured of a comfortable living and safeguards for disability and old age; he occupies an honorable position in which there is opportunity for professional advancement, depending on his ability and application; and he may render distinguished service and establish a permanent reputation in some field of his profession. If he is willing and anxious to serve, it is a pleasant and useful career.

DEATHS DURING WEEK ENDED AUGUST 30, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended August 30, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Aug. 30, 1930	Corresponding week, 1929
Policies in force	75, 702, 504	74, 642, 901
Number of death claims	12, 295	11, 973
Death claims per 1,000 policies in force, annual rate	8. 5	8. 4

Deaths[1] *from all causes in certain large cities of the United States during the week ended August 30, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Aug. 30, 1930				Corresponding week 1929		Death rate[2] for first 35 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1930	1929
Total (77 cities)	6,827	10.3	625	[4] 49	10.4	719	12.3	13.1
Akron	31	6.4	5	46	7.4	6	8.0	9.7
Albany [5]	41	16.7	5	109	11.6	3	15.2	16.5
Atlanta	65	12.7	7	74	8.9	3	16.8	16.4
White	37		4	127		1		
Colored	28	(6)	3	48	(6)	2	(6)	(6)
Baltimore [5]	165	10.7	10	34	12.0	21	14.4	15.3
White	114		9	39		16		
Colored	51	(6)	1	16	(6)	5	(6)	(6)
Birmingham	44	8.8	5	47	17.6	11	14.1	16.9
White	12		2	31		5		
Colored	32	(6)	3	71	(6)	6	(6)	(6)
Boston	170	11.3	21	59	12.2	24	14.4	15.8
Bridgeport	25	8.9	3	51	10.6	3	11.3	12.7
Buffalo	120	10.9	9	40	12.7	16	13.2	14.5
Cambridge	16	7.3	2	37	10.1	3	12.1	13.2
Camden	34	15.1	5	91	12.9	5	14.1	14.9
Canton	25	12.3	3	74	11.5	2	10.4	11.8
Chicago [5]	592	9.1	50	44	9.4	76	10.6	11.7
Cincinnati	110	12.7	3	18	14.4	17	15.9	17.6
Cleveland	184	10.6	12	36	9.0	20	11.4	13.0
Columbus	89	16.0	4	39	7.1	6	16.3	15.3
Dallas	42	8.3	5		7.4	6	12.0	12.0
White	25		4			4		
Colored	17	(6)	1		(6)	2	(6)	(6)
Dayton	43	11.1	5	74	7.4	4	10.6	11.7
Denver	102	18.4	13	136	13.9	7	14.9	15.3
Des Moines	32	11.7	3	52	8.1	1	12.1	11.9
Detroit	248	8.2	28	43	9.5	45	9.7	11.6
Duluth	20	10.3	4	108	11.4	3	11.4	11.8
El Paso	31	15.8	8		16.1	6	18.2	20.8
Erie	22	9.9	2	43	7.7	3	11.5	12.9
Fall River [5] [7]	23	10.5	1	23	8.2	0	12.5	14.8
Flint	24	7.9	3	35	9.3	6	9.4	10.9
Fort Worth	14	4.5	2		9.8	4	11.4	13.0
White	12		2			4		
Colored	2	(6)	0		(6)	0	(6)	(6)
Grand Rapids	30	9.3	4	61	9.4	5	10.6	10.4
Houston	62	11.1	10		11.1	11	12.5	13.1
White	39		8			8		
Colored	23	(6)	2		(6)	3	(6)	(6)
Indianapolis	100	14.3	6	45	11.6	8	15.0	15.1
White	83		5	43		7		
Colored	17	(6)	1	54	(6)	1	(6)	(6)
Jersey City	58	9.6	4	35	9.1	2	11.6	13.0
Kansas City, Kans	33	14.0	2	47	14.1	0	11.5	14.0
White	20		0	0		0		
Colored	13	(6)	2	435	(6)	0	(6)	(6)
Kansas City, Mo	81	10.7	6	47	12.1	8	13.7	14.5
Los Angeles	271	11.3	19	58	8.2	10	11.3	11.6
Louisville	88	14.9	5	43	10.7	8	14.1	15.6
White	71		5	49		6		
Colored	17	(6)	0	0	(6)	2	(6)	(6)
Lowell [7]	16	8.3	0	0	6.7	2	13.9	14.8
Lynn	12	6.1	1	25	7.7	2	10.8	11.7
Memphis	82	16.9	11	131	17.1	9	18.0	19.5
White	32		5	92		6		
Colored	50	(6)	6	202	(6)	3	(6)	(6)
Milwaukee	95	8.7	10	50	9.4	11	10.0	11.4
Minneapolis	93	10.4	11	71	8.1	4	10.8	11.2
Nashville	44	15.6	8	124	15.6	8	17.9	19.7
White	26		6	123		7		
Colored	18	(6)	2	127	(6)	1	(6)	(6)

Footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended August 30, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*—Continued

City	Week ended Aug. 30, 1930				Corresponding week, 1929		Death rate for first 35 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1930	1929
New Bedford [7]	16	7.4	0	0	11.5	2	11.2	13.2
New Haven	27	8.7	1	19	18.6	1	13.3	13.8
New Orleans	125	14.2	11	64	15.0	18	17.9	18.1
White	72		8	71		11		
Colored	53	(6)	3	50	(6)	7	(6)	(6)
New York	1,201	9.0	122	51	8.8	119	11.1	11.8
Bronx Boro	171	7.0	17	40	6.4	10	8.1	8.5
Brooklyn Boro	402	8.0	48	51	8.1	48	10.1	10.6
Manhattan Boro	470	13.3	51	84	11.9	45	16.7	17.1
Queens Boro	125	6.0	3	87	6.6	8	7.3	7.9
Richmond Boro	33	10.9	3	56	15.9	8	14.7	16.3
Newark, N. J	79	9.3	4	21	10.5	8	12.3	13.3
Oakland	58	10.6	3	36	10.6	5	11.1	11.7
Oklahoma City	31	8.7	4	79	7.1	3	10.9	10.9
Omaha	40	9.7	1	11	13.7	4	14.0	14.2
Paterson	35	13.2	6	104	8.3	5	12.6	13.7
Philadelphia	355	9.4	32	47	10.9	39	12.8	13.6
Pittsburgh	174	13.5	25	92	12.5	17	14.1	15.3
Portland, Oreg	66	11.5	4	49	12.0	0	12.6	13.2
Providence	50	10.4	8	73	12.7	5	13.5	15.2
Richmond	38	10.8	4	59	11.7	3	15.3	16.9
White	21		3	67		2		
Colored	17	(6)	1	44	(6)	1	(6)	(6)
Rochester	63	10.1	5	44	10.3	8	11.9	12.9
St. Louis	185	11.7	7	23	13.1	16	14.7	15.3
St. Paul	44	8.4	1	10	9.5	4	10.3	10.8
Salt Lake City [5]	34	12.6	3	47	10.5	2	12.8	13.4
San Antonio	63	12.8	16		10.9	10	15.9	15.3
San Diego	45	15.7	4	84	12.0	2	14.6	15.7
San Francisco	118	9.8	4	27	13.6	4	13.3	13.5
Schenectady	24	13.1	2	62	15.3	2	11.5	12.9
Seattle	69	9.9	1	10	10.4	4	11.2	11.3
Somerville	18	9.0	1	33	6.6	1	10.1	9.5
Spokane	19	8.6	0	0	7.7	0	12.4	13.1
Springfield, Mass	33	11.4	2	32	10.5	5	12.5	13.2
Syracuse	34	8.5	1	12	10.9	9	12.0	13.6
Tacoma	27	13.2	0	0	9.3	1	12.9	11.9
Toledo	66	11.8	7	64	12.7	7	12.9	14.0
Trenton	36	15.3	3	56	13.2	3	17.2	17.6
Utica	24	12.2	2	57	12.8	1	15.1	15.9
Washington, D. C	130	13.9	11	64	12.7	13	15.6	15.9
White	80		9	78		4		
Colored	50	(6)	2	35	(6)	9	(6)	(6)
Waterbury	10	5.1	2	51	5.2	0	10.1	9.8
Wilmington, Del.[7]	26	12.9	2	45	9.4	1	14.9	14.2
Worcester	47	12.5	7	91	10.7	3	13.2	13.1
Yonkers	18	6.9	1	24	7.1	1	8.2	9.5
Youngstown	22	6.7	3	47	11.6	4	10.3	12.5

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 72 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended September 6, 1930, and September 7, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 6, 1930, and September 7, 1929

Division and State	Diptheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929
New England States:								
Maine						4	0	0
New Hampshire	2	3	2			1	0	0
Vermont		1				3	0	0
Massachusetts	30	43	2	2	24	22	1	1
Rhode Island	4	2					0	0
Connecticut	5	4	1	1		3	3	0
Middle Atlantic States:								
New York	57	71	[1] 3	[1] 7	73	137	11	14
New Jersey	41	37	3	3	15	9	1	9
Pennsylvania	50	68			48	49	11	12
East North Central States:								
Ohio	27	29	7	10	15	27	5	2
Indiana	16	23	3		1	6	1	1
Illinois	57	106	15	6	12	31	2	6
Michigan	25	46	1		35	48	9	33
Wisconsin	6	21	25	7	14	24	2	1
West North Central States:								
Minnesota	12	8	1	4		4	1	2
Iowa	1	4				2	0	1
Missouri	23	14	1	3	14	1	2	4
North Dakota	1	4				20	0	7
South Dakota	6	1			1	2	0	0
Nebraska	1	9			1		1	0
Kansas	14	10	1	1	7	9	1	1
South Atlantic States:								
Delaware	2				1		0	0
Maryland [2]	12	14	2	5		2	0	0
District of Columbia	9	8	1		9		0	0
Virginia								
West Virginia	11	17		7	3	1	0	3
North Carolina	95	136	3		2	3	1	1
South Carolina	40	54	216	265			0	0
Georgia	21	18	13	30	10		0	0
Florida	6	12			1	1	1	0

[1] New York City only. [2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 6, 1930, and September 7, 1929—Continued

Division and State	Diptheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929
East South Central States:								
Kentucky							4	0
Tennessee	23		3		2	3	1	2
Alabama	23	49	4	2	7	6	2	0
Mississippi	15	40					1	1
West South Central States:								
Arkansas	7	3	1	2			0	0
Louisiana	21	26	3	23	2	4	0	0
Oklahoma [2]	10	30	4	19	1	4	1	0
Texas	26	52	8	14	8	3	1	0
Mountain States:								
Montana		2			6	1	1	0
Idaho					1	3	0	0
Wyoming	1					7	0	0
Colorado	9	6			4	4	1	2
New Mexico	1	4			3		2	0
Arizona	10	4					1	3
Utah [1]	1		4	4	2		2	1
Pacific States:								
Washington	15	7			27	9	0	2
Oregon	1	3	7		25	4	0	0
California	30	26	13	7	40	28	2	9

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929
New England States:								
Maine	10	0	2	16	0	0	4	
New Hampshire	2	0	2	1	0	0	0	1
Vermont	0	0	1		0	0	0	3
Massachusetts	13	8	40	55	0	0	8	12
Rhode Island	1	0	4	1	0	0	2	2
Connecticut	1	0	3	5	0	0	2	1
Middle Atlantic States:								
New York	47	36	56	55	1	1	32	62
New Jersey	1	2	20	23	0	0	16	19
Pennsylvania	9	9	80	77	0	3	98	49
East North Central States:								
Ohio	55	10	81	85	12	33	65	68
Indiana	7	1	11	25	32	10	16	17
Illinois	19	6	64	88	19	15	56	24
Michigan	6	19	54	48	12	23	8	7
Wisconsin	9	1	20	26	3	4	8	18
West North Central States:								
Minnesota	11	0	22	37	1	6	4	7
Iowa	10	3	8	15	6	5	11	10
Missouri	10	1	27	19	5	8	16	9
North Dakota	1	0	0	8	0	1	2	1
South Dakota	5	0	3	4	9	4	6	4
Nebraska	7	0	9	7	8	14	5	3
Kansas	84	0	15	14	3	7	19	24
South Atlantic States:								
Delaware	1	0	4		0	0	7	1
Maryland [1]	2	0	17	25	0	0	48	16
District of Columbia	1	1	4	11	0	0	2	4
Virginia		19						
West Virginia	2	5	17	18	5	3	61	41
North Carolina	9	3	78	74	0	1	68	56
South Carolina	4	2	17	9	0	0	74	66
Georgia	0	1	23	20	0	0	40	33
Florida	0	0	2	2	0	0	2	1

[1] Week ended Friday.
[2] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 6, 1930, and September 7, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929	Week ended Sept. 6, 1930	Week ended Sept. 7, 1929
East South Central States:								
Kentucky	0	0	36	37	3	0	68	50
Tennessee	3	1	33		2	1	90	53
Alabama	3	8	21	28	1	0	25	21
Mississippi	2	0	4	18	7	1	32	29
West South Central States:								
Arkansas	1	0	22	9	1	0	42	25
Louisiana	6	0	18	4	0	2	36	19
Oklahoma [3]	7	0	10	25	1	4	44	68
Texas	2	3	17	32	6	14	15	36
Mountain States:								
Montana	1	1	10	5	7	1	5	5
Idaho	1	0	2		0	3	0	2
Wyoming	3	0	3	4	0	0	0	2
Colorado	4	0	3	7	0	7	0	19
New Mexico	1	0	4	4	1	0	7	9
Arizona	0	1	7	0	1	0	5	2
Utah [1]	0	0	2	2	0	1	1	0
Pacific States:								
Washington	6	0	20	17	11	15	2	8
Oregon	0	0	12	4	7	10	5	6
California	53	4	36	61	11	5	14	18

[1] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July, 1930										
Colorado	3	27			174		0	22	9	15
Delaware		4			23		0	14	0	3
Mississippi	9	43	207	7,430	107	1,390	10	15	5	297
South Carolina		71	248	2,206	13	1,240	8	13	1	286
Texas	1	51	20	1,336		2	11	36		78
August, 1930										
Arizona	1	11	2		37		3	7	1	27
Connecticut	3	24	3	3	32		6	31	0	5
Delaware		8			13		2	6	0	29
District of Columbia	1	13	1		26	1	1	14	0	21
Georgia	3	47	34	513	45	59	4	61	3	244
Nebraska		19	2		28		12	17	36	20
New Mexico	2	32	1	79	14	11	4	6	12	28
Wyoming					2		5	15	0	3

July, 1930

	Cases
Chicken pox:	
Colorado	29
Delaware	3
Mississippi	242
South Carolina	103
Dengue:	
Mississippi	10
South Carolina	5
Dysentery:	
Mississippi (amebic)	115
Mississippi (bacillary)	1,782
Hookworm disease:	
Mississippi	368
South Carolina	106
Lethargic encephalities:	
South Carolina	1
Mumps:	
Colorado	43
Delaware	1
Mississippi	251
South Carolina	69
Ophthalmia neonatorum:	
Mississippi	15
South Carolina	6
Paratyphoid fever:	
Colorado	1
South Carolina	12
Texas	3
Puerperal septicemia:	
Mississippi	41
Rabies in animals:	
Mississippi	5
South Carolina	9
Rocky Mountain spotted or tick fever:	
Colorado	1
Scabies:	
Delaware	18
Tetanus:	
Colorado	1
Trachoma:	
Mississippi	13
Typhus fever:	
South Carolina	1
Undulant fever:	
Delaware	2
South Carolina	1
Vincent's angina:	
Colorado	3
Whooping cough:	
Colorado	261
Delaware	22
Mississippi	732
South Carolina	250

August, 1930

	Cases
Chicken pox:	
Arizona	2
Connecticut	17
District of Columbia	7
Georgia	4
Nebraska	25
Wyoming	2
Conjunctivitis, acute infectious:	
Georgia	2
Dysentery:	
Arizona	42
Connecticut (bacillary)	1
Georgia	41
Favus:	
Connecticut	2
German measles:	
Connecticut	6
Hookworm disease:	
Georgia	31
Lead posioning:	
Connecticut	1
Lethargic encephalitis:	
Connecticut	2
District of Columbia	1
Mumps:	
Arizona	9
Connecticut	23
Delaware	3
Georgia	24
Nebraska	6
New Mexico	13
Wyoming	2
Paratyphoid fever:	
Connecticut	1
Georgia	4
Psittacosis:	
Georgia	1
Rabies in animals:	
Connecticut	9
Rocky Mountain spotted or tick fever:	
Wyoming	1
Septic sore throat:	
Connecticut	2
Georgia	50
Nebraska	1
Tetanus:	
Connecticut	1
Trachoma:	
Arizona	9
Trichinosis:	
Connecticut	3
Typhus fever:	
Delaware	2
District of Columbia	2
Georgia	13
Undulant fever:	
Arizona	3
Delaware	1
Georgia	2
Whooping cough:	
Arizona	29
Connecticut	129
Delaware	4
District of Columbia	22
Georgia	75
Nebraska	58
New Mexico	12
Wyoming	15

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of July, 1930. by departments of health of certain States to other State health departments

Disease	Alabama	California	Illinois	Kansas	Massachusetts	Minnesota	New York
Chicken pox			1				
Encephalitis						1	
Gonorrhea						1	
Malaria			1				
Measles					1		1
Poliomyelitis			1			1	
Scarlet fever							2
Smallpox			8				2
Syphilis				7		1	
Tuberculosis	1		9			20	
Typhoid fever		1	3			1	3
Undulant fever						1	1
Whooping cough							1

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,920,000. The estimated population of the 88 cities reporting deaths is more than 30,330,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended Augus' 30, 1930, and August 31, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	631	1,017	
95 cities	242	373	441
Measles:			
45 States	445	472	
95 cities	123	86	
Meningococcus meningitis:			
46 States	87	84	
95 cities	39	60	
Poliomyelitis:			
46 States	344	124	
Scarlet fever:			
46 States	650	859	
95 cities	258	245	264
Smallpox:			
46 States	122	149	
95 cities	10	25	8
Typhoid fever:			
46 States	916	829	
95 cities	153	161	181
Deaths reported			
Influenza and pneumonia:			
88 cities	329	321	
Smallpox:			
88 cities	0	0	

City reports for week ended August 30, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	0		0	0	1	3
New Hampshire:								
Concord	0	0	0		0	0	0	0
Vermont:								
Barre	4	0	0		0	0	0	0
Massachusetts:								
Boston	8	19	9	3	0	8	2	14
Fall River	0	1	5		0	0	1	1
Springfield	0	1	3		0	0	0	0
Worcester	2	3	1		0	0	0	1
Rhode Island:								
Pawtucket	0	0	1		0	0	0	0
Providence	0	2	3		0	0	0	1
Connecticut:								
Bridgeport	0	3	0		0	0	0	0
Hartford		2						
New Haven	0	2	0		0	0	0	0
MIDDLE ATLANTIC								
New York:								
Buffalo	9	8	14		0	5	4	15
New York	8	76	32	5	4	27	15	69
Rochester	4	3	1		0	0	2	0
Syracuse	0	1	0		0	3	2	3
New Jersey:								
Camden	0	2	2		0	2	0	3
Newark	1	6	4	2	0	0	2	6
Trenton	0	1	1		0	0	0	4
Pennsylvania:								
Philadelphia	4	28	6	1	2	11	4	12
Pittsburgh	2	11	3	1	0	1	3	13
Reading	0	1	1		0	0	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	2	4	0		0	0	0	7
Cleveland	5	21	7	3	1	3	3	10
Columbus	0	2	0		2	0	0	2
Toledo	1	5	1	1	1	0	1	4
Indiana:								
Fort Wayne	0	1	0		0	0	0	2
Indianapolis	1	2	2		0	1	0	10
South Bend	0	1	0		0	0	0	1
Terre Haute	0	0	0		0	0	0	0
Illinois:								
Chicago	8	51	52	3	3	3	16	25
Springfield	0	0	0		0	0	0	0
Michigan:								
Detroit	0	24	9	1	0	1	2	12
Flint	1	1	1		0	1	0	1
Grand Rapids	0	1	0		1	0	0	3
Wisconsin:								
Kenosha	0	0	0		0	0	0	1
Madison	0	1	0			0	0	
Milwaukee	9	7	1		0	3	4	5
Racine	1	0	1		0	0	0	0
Superior	1	0	0		0	0	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0		0	0	0	0
Minneapolis	5	12	0		1	2	0	0
St. Paul	2	6	1		0	0	0	5

City reports for week ended August 30, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL—continued								
Iowa:								
Davenport	0	0	0	------	------	0	0	------
Des Moines	0	1	0	------	------	0	0	------
Sioux City	0	0	0	------	------	0	0	------
Waterloo	0	0	0	------	------	0	0	------
Missouri:								
Kansas City	1	2	1	------	0	1	2	2
St. Joseph	0	0	0	------	0	0	0	1
St. Louis	3	17	11	------	------	8	2	------
North Dakota:								
Fargo	0	0	0	------	0	0	2	0
South Dakota:								
Aberdeen	0	0	1	------	------	0	0	------
Nebraska:								
Omaha	4	4	0	------	0	1	0	4
Kansas:								
Topeka	0	0	1	------	0	0	2	1
Wichita	0	1	0	------	0	2	0	0
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	0	0	------	0	0	0	0
Maryland:								
Baltimore	0	11	6	1	2	3	4	7
Cumberland	0	0	0	------	0	0	0	1
Frederick	0	0	0	------	0	0	0	0
District of Columbia:								
Washington	0	8	3	------	0	1	0	7
Virginia:								
Lynchburg	0	1	0	------	0	0	0	0
Norfolk	0	1	0	------	0	2	0	1
Richmond	0	8	2	------	0	8	0	0
Roanoke	0	3	1	------	0	0	0	0
West Virginia:								
Charleston	0	1	1	------	0	0	0	0
Wheeling	0	1	0	------	0	0	0	2
North Carolina:								
Raleigh	0	1	0	------	0	0	0	1
Wilmington	2	0	4	------	0	1	0	3
Winston-Salem	0	2	0	------	0	0	0	2
South Carolina:								
Charleston	0	0	0	3	1	0	0	1
Columbia	------	0	------	------	------	------	------	------
Georgia:								
Atlanta	1	4	10	------	0	1	1	4
Brunswick	0	0	1	------	0	0	0	0
Savannah	0	0	3	4	1	0	0	0
Florida:								
Miami	0	1	2	------	0	0	0	0
St. Petersburg	------	0	------	------	0	------	------	0
Tampa	0	2	1	------	0	2	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0	------	0	0	0	0
Tennessee:								
Memphis	0	2	0	------	0	0	0	2
Nashville	0	3	0	------	0	1	0	1
Alabama:								
Birmingham	0	3	2	2	1	1	1	3
Mobile	0	0	0	------	0	0	0	1
Montgomery	0	1	0	------	------	0	0	------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0	------	------	0	0	------
Little Rock	0	0	0	------	0	0	0	0
Louisiana:								
New Orleans	0	6	6	2	2	0	0	5
Shreveport	0	0	0	------	0	0	0	0
Texas:								
Dallas	1	5	4	------	0	3	0	0
Fort Worth	0	2	2	------	0	0	0	0
Galveston	0	0	0	------	0	0	0	0
Houston	0	3	4	------	0	0	0	1
San Antonio	0	2	5	------	0	0	0	4

City reports for week ended August 30, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MOUNTAIN								
Montana:								
Billings	0	0	0		0	0	0	1
Great Falls	0	0	0		0	0	0	0
Helena		0						
Missoula	0	0	0		0	1	0	0
Idaho:								
Boise	0	0	0		0	0	0	0
Colorado:								
Denver	0	8	8		0	2	1	3
Pueblo	3	1	0		0	0	2	1
New Mexico:								
Albuquerque	0	1	2		0	0	2	0
Arizona:								
Phoenix	0	0	1		0	0	0	2
Utah:								
Salt Lake City	3	2	0		0	0	0	1
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	1	2	1			1	5	
Spokane	1	1	1			3	0	
Tacoma	1	1	0		0	0	0	3
Oregon:								
Portland	3	4	2		0	2	0	2
Salem	0	0	0		0	0	0	0
California:								
Los Angeles	7	22	5	7	0	6	7	12
Sacramento	1	2	0		0	0	1	1
San Francisco	6	9	1	4	1	5	5	2

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	0	1	0	0	0	0	1	1	1	10	26
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	3
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	4	2
Massachusetts:											
Boston	14	11	0	0	0	12	3	1	0	38	170
Fall River	0	3	0	0	0	1	1	0	0	3	23
Springfield	1	0	0	0	0	1	0	2	0	3	30
Worcester	2	5	0	0	0	0	6	0	0	11	47
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	17
Providence	2	2	0	0	0	1	2	1	0	3	50
Connecticut:											
Bridgeport	1	0	0	0	0	2	0	0	0	2	25
Hartford	1		0				0				
New Haven	1	0	0	0	0	0	3	0	0	3	27
MIDDLE ATLANTIC											
New York:											
Buffalo	5	7	0	0	0	5	1	0	0	50	113
New York	22	14	0	0	0	90	43	19	4	71	1,200
Rochester	1	4	0	0	0	2	1	0	0	11	59
Syracuse	1	5	0	0	0	1	1	1	0	40	34
New Jersey:											
Camden	0	1	0	0	0	2	1	1	0	0	34
Newark	3	1	0	0	0	7	2	4	0	24	80
Trenton	0	2	0	0	0	2	1	0	0	0	36
Pennsylvania:											
Philadelphia	15	17	0	0	0	30	10	11	2	25	355
Pittsburgh	8	7	0	0	0	11	2	6	0	20	174
Reading	0	0	0	0	0	3	0	1	0	1	12

City reports for week ended August 30, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	5	0	0	0	6	3	0	0	1	110
Cleveland	10	3	0	0	0	15	4	4	1	31	184
Columbus	3	2	0	0	0	4	0	0	0	0	-------
Toledo	2	2	0	1	0	4	3	2	0	3	66
Indiana:											
Fort Wayne	1	0	0	0	0	1	1	1	0	0	23
Indianapolis	3	0	0	0	0	0	1	2	1	8	-------
South Bend	1	1	0	0	0	0	0	0	0	1	12
Terre Haute	1	0	0	0	0	0	0	0	0	1	25
Illinois:											
Chicago	26	35	0	0	0	38	6	5	1	39	592
Springfield	0	0	0	0	0	1	0	0	0	0	15
Michigan:											
Detroit	23	15	0	0	0	30	4	3	0	69	246
Flint	4	8	1	0	0	1	2	0	0	1	24
Grand Rapids	3	3	0	0	0	0	0	0	0	7	30
Wisconsin:											
Kenosha	0	0	0	0	0	0	0	0	0	0	10
Madison	1	0	1	0	-------	-------	0	5	-------	6	-------
Milwaukee	8	3	0	0	0	3	1	1	0	35	95
Racine	2	0	0	0	0	1	0	0	0	15	14
Superior	1	1	1	0	0	0	0	0	0	0	9
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	1	0	0	0	0	0	0	0	9	20
Minneapolis	13	1	1	0	0	3	1	1	0	0	93
St. Paul	6	0	0	0	0	2	1	1	0	11	58
Iowa:											
Davenport	1	0	0	2	-------	-------	0	0	-------	0	-------
Des Moines	2	0	0	2	-------	-------	0	0	-------	0	32
Sioux City	0	1	0	0	-------	-------	0	0	-------	3	-------
Waterloo	0	0	0	0	-------	-------	0	0	-------	0	-------
Missouri:											
Kansas City	2	4	0	0	0	11	2	2	1	1	81
St. Joseph	0	1	0	0	0	0	0	0	0	2	16
St. Louis	10	10	0	0	0	14	7	5	2	4	185
North Dakota:											
Fargo	1	0	0	0	0	1	0	0	0	2	9
South Dakota:											
Aberdeen	1	0	0	0	-------	-------	0	1	-------	2	-------
Nebraska:											
Omaha	1	3	0	3	0	1	1	0	0	3	40
Kansas:											
Topeka	2	1	0	0	0	0	0	1	0	5	25
Wichita	1	0	0	1	0	2	2	0	0	8	31
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	1	0	0	0	0	1	0	0	0	27
Maryland:											
Baltimore	5	4	0	0	0	14	9	12	0	19	165
Cumberland	0	1	0	0	0	0	1	3	0	0	8
Frederick	0	0	0	0	0	0	1	0	0	0	3
District of Columbia:											
Washington	4	4	0	0	0	6	4	12	0	5	130
Virginia:											
Lynchburg	0	0	0	0	0	1	0	4	0	1	12
Norfolk	0	3	0	0	0	0	2	10	1	0	-------
Richmond	3	0	0	0	0	3	3	0	0	0	38
Roanoke	1	4	0	0	0	0	0	0	0	0	8
West Virginia:											
Charleston	1	0	0	0	0	1	1	0	0	0	7
Wheeling	1	1	0	0	0	0	0	0	1	1	15
North Carolina:											
Raleigh	0	1	0	0	0	0	0	0	0	0	17
Wilmington	0	4	0	0	0	0	0	4	0	40	11
Winston-Salem	1	0	0	0	0	2	1	1	0	4	24

City reports for week ended August 30, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
SOUTH ATLANTIC—continued											
South Carolina:											
Charleston	0	3	0	0	0	1	3	3	0	0	17
Columbia	0		0				1				
Georgia:											
Atlanta	4	11	1	0	0	6	4	5	2	0	65
Brunswick	0	0	0	0	0	0	0	0	0	0	6
Savannah	0	1	0	0	0	3	1	0	0	0	29
Florida:											
Miami	0	1	0	0	0	1	0	0	0	0	16
St. Petersburg	0		0		0	0	0		0		11
Tampa	1	1	0	0	0	0	1	0	0	0	15
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	0	0	0	0	1	1	0	0	0	19
Tennessee:											
Memphis	1	2	0	0	0	5	6	3	1	9	82
Nashville	1	0	0	0	0	2	6	1	0	11	49
Alabama:											
Birmingham	4	6	0	0	0	2	5	3	0	0	44
Mobile	0	0	0	0	0	1	1	0	0	0	16
Montgomery	0	9		0			0	0		0	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	1	0	0			0	0		0	
Little Rock	0	0	0	0	0	0	2	2	0	0	
Louisiana:											
New Orleans	1	0	0	0	0	10	4	11	0	3	125
Shreveport	1	0	0	0	0	4	1	0	1	0	33
Texas:											
Dallas	2	1	0	0	0	3	3	4	1	0	42
Fort Worth	1	1	0	0	0	0	2	1	0	0	14
Galveston	0	0	0	0	0	1	0	0	0	0	10
Houston	1	0	0	1	0	7	1	1	0	0	62
San Antonio	2	2	0	0	0	5	2	1	0	0	63
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	7
Great Falls	0	1	0	0	0	1	1	0	0	1	9
Helena	0		0				0				
Missoula	0	1	0	0	0	0	0	0	0	0	4
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	0	4
Colorado:											
Denver	3	5	0	0	0	11	1	1	0	31	103
Pueblo	0	0	0	0	0	0	0	0	0	2	12
New Mexico:											
Albuquerque	0	0	0	0	0	4	0	0	0	0	16
Arizona:											
Phoenix	0	0	0	0	0	2	0	0	1	0	20
Utah:											
Salt Lake City	1	3	0	0	0	2	2	4	1	27	31
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	2
PACIFIC											
Washington:											
Seattle	[illegible]	6	0	0			2	1		6	
Spokane	2	0	1	2			0	0		0	
Tacoma	0	1	1	0	0	0	1	0	0	0	27
Oregon:											
Portland	2	0	3	1	0	5	0	1	1	1	66
Salem	0	0	0	0	0	0	0	0	0	4	
California:											
Los Angeles	8	2	2	0	0	13	3	2	0	11	271
Sacramento	1	2	0	1	0	0	0	1	0	0	20
San Francisco	6	2	0	2	0	10	1	0	0	7	142

City reports for week ended August 30, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	4	0
Massachusetts:									
Boston [1]	2	2	0	0	0	0	3	7	0
Worcester	1	1	0	0	0	0	0	0	0
Rhode Island:									
Pawtucket	1	0	0	0	0	0	0	0	0
Providence	0	1	0	0	0	0	1	0	0
MIDDLE ATLANTIC									
New York:									
Buffalo	2	1	0	0	0	0	1	4	1
New York [2]	5	4	2	0	0	1	14	4	1
Rochester	0	0	1	0	0	0	0	1	1
Syracuse	0	0	0	0	0	0	2	6	0
New Jersey:									
Newark	1	0	0	0	0	0	0	1	0
Pennsylvania:									
Philadelphia	5	1	0	0	1	0	1	5	0
Pittsburgh	3	4	0	1	0	0	0	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	2	1	0	0	0	0	0	3	0
Cleveland [2]	0	0	0	0	0	0	1	6	0
Columbus	0	0	0	0	0	0	0	3	0
Toledo	1	0	0	0	0	0	0	1	0
Indiana:									
Indianapolis	3	2	0	0	0	0	0	1	0
Illinois:									
Chicago	2	1	0	1	0	0	3	13	2
Michigan:									
Detroit	3	0	1	0	0	0	2	2	0
Flint	0	0	1	0	0	0	0	0	0
Wisconsin:									
Madison	1	0	0	0	0	0	1	0	0
Milwaukee	1	2	0	0	0	0	0	0	0
Superior	0	0	0	1	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	1	0	0	0	0	0	0	0	0
Minneapolis	1	1	0	0	0	0	0	0	0
Iowa:									
Sioux City	0	0	0	0	0	0	0	3	0
Waterloo	0	0	0	0	0	0	0	3	0
Missouri:									
Kansas City	0	0	0	0	0	0	0	1	0
St. Louis	4	4	0	1	0	0	1	0	0
Nebraska:									
Omaha	0	0	0	0	0	0	1	1	0
Kansas:									
Topeka	0	0	0	0	0	0	0	2	0
Wichita	0	0	0	0	0	0	0	6	1
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	0	0	0	0	1	2	0
District of Columbia:									
Washington	0	0	0	0	1	0	0	0	0
Virginia:									
Norfolk	0	0	0	0	0	1	0	1	0
Richmond	0	1	0	0	0	0	0	0	0

[1] Typhus fever, 9 cases: One case at Boston, Mass., and 8 cases at Savannah, Ga.
[2] Rabies (in man), 2 deaths: One death at New York City, N. Y., and 1 death at Cleveland, Ohio.

City reports for week ended August 30, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
SOUTH ATLANTIC—contd									
North Carolina:									
Raleigh	0	0	0	0	1	2	0	0	0
Wilmington	0	0	0	0	6	1	0	0	0
Winston-Salem	0	1	0	0	0	0	1	0	0
South Carolina:									
Charleston	0	0	0	0	1	0	0	0	0
Georgia:									
Atlanta	0	0	0	0	0	0	0	1	0
Savannah [1]	0	0	0	0	0	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	1	0	0	0	0	0	0	0
Alabama:									
Birmingham	1	0	0	1	0	0	1	0	0
Mobile	0	0	0	0	0	1	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	8	1	0	1	0
Shreveport	0	0	0	0	0	1	0	0	0
Texas:									
Houston	0	0	0	0	0	0	1	2	0
MOUNTAIN									
Montana:									
Missoula	0	0	0	0	1	0	0	0	0
Utah:									
Salt Lake	1	0	0	0	0	0	1	0	0
PACIFIC									
Washington:									
Spokane	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	0	0	0	0	0	0	1	20	0
Sacramento	0	0	0	0	1	0	0	0	0
San Francisco	1	0	0	0	0	0	0	8	1

[1] Typhus fever, 9 cases: 1 case at Boston, Mass., and 8 cases at Savannah, Ga.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended August 30, 1930, compared with those for a like period ended August 31, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, July 27 to August 30, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929
98 cities	39	67	38	[2] 63	31	61	[3] 34	61	[4] 40	62
New England	33	54	31	45	40	38	40	63	[5] 53	45
Middle Atlantic	35	67	34	70	23	59	28	58	31	54
East North Central	49	99	48	81	36	86	[6] 41	69	46	75
West North Central	34	25	28	31	27	23	25	25	27	25
South Atlantic	37	47	16	30	35	47	37	75	[7] 60	90
East South Central	[illegible]	34	20	[2] 30	34	82	13	55	13	116
West South Central	37	95	52	118	52	122	67	141	71	137
Mountain	34	9	17	35	17	44	43	26	[8] 70	17
Pacific	52	46	66	43	35	31	[9] 26	29	19	27

MEASLES CASE RATES

	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929
98 cities	68	49	50	[2] 30	33	24	[3] 28	20	[4] 20	14
New England	97	97	91	31	60	29	60	38	[5] 19	20
Middle Atlantic	91	35	65	15	41	15	33	13	23	8
East North Central	34	84	28	58	19	35	[6] 20	33	8	22
West North Central	42	38	51	33	30	13	19	8	27	8
South Atlantic	55	11	22	9	22	15	18	0	[7] 60	13
East South Central	40	7	20	[2] 7	20	0	7	14	13	7
West South Central	11	8	11	19	7	23	0	4	11	8
Mountain	154	26	112	61	43	52	26	52	[8] 35	44
Pacific	118	43	73	24	50	46	[9] 55	39	35	19

SCARLET FEVER CASE RATES

	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929
98 cities	39	40	32	[2] 44	31	39	[3] 33	41	[4] 42	41
New England	55	63	42	52	51	49	47	45	[5] 53	38
Middle Atlantic	22	24	21	23	18	17	27	15	28	16
East North Central	50	62	46	72	39	50	[6] 34	63	48	63
West North Central	49	35	27	44	28	40	34	58	42	44
South Atlantic	40	28	18	41	26	73	27	34	[7] 67	45
East South Central	7	34	13	[2] 15	54	14	34	68	115	34
West South Central	56	38	37	42	34	38	37	65	15	72
Mountain	60	9	69	44	43	78	86	44	[8] 88	61
Pacific	40	48	45	56	38	53	[9] 29	51	31	46

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930, and 1929, respectively.
[2] Montgomery, Ala., not included.
[3] Racine, Wis., and San Francisco, Calif., not included.
[4] Hartford, Conn., Columbia, S. C., and Helena, Mont., not included.
[5] Hartford, Conn., not included.
[6] Racine, Wis., not included.
[7] Columbia, S. C., not included.
[8] Helena, Mont., not included.
[9] San Francisco, Calif., not included.

Summary of weekly reports from cities, July 27 to August 30, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

SMALLPOX CASE RATES

	Week ended—									
	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929
98 cities	4	7	3	[2] 5	3	7	[3] 2	3	[4] 2	4
New England	0	0	0	0	0	0	0	0	[5] 0	0
Middle Atlantic	0	0	0	0	0	3	0	0	0	0
East North Central	2	13	6	12	3	16	[6] 0	4	0	10
West North Central	13	6	6	10	6	4	8	6	8	4
South Atlantic	4	0	2	0	0	0	2	0	[7] 0	0
East South Central	0	7	0	[2] 7	7	7	0	0	0	0
West South Central	15	4	7	0	4	0	7	8	4	4
Mountain	0	26	0	0	0	9	0	26	[8] 0	0
Pacific	26	34	5	17	14	12	[9] 16	17	12	14

TYPHOID FEVER CASE RATES

	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929
98 cities	18	19	17	[2] 17	21	20	[3] 20	30	[4] 25	27
New England	7	11	4	13	4	11	16	27	[5] 12	29
Middle Atlantic	5	11	10	11	15	19	14	34	21	28
East North Central	13	10	11	11	10	5	[6] 9	12	10	13
West North Central	23	33	19	15	28	6	21	13	19	23
South Atlantic	48	22	60	22	40	30	55	51	[7] 82	52
East South Central	121	150	67	[2] 45	148	123	88	103	47	103
West South Central	45	53	15	61	45	46	26	88	71	50
Mountain	26	9	34	9	26	61	26	70	[8] 44	17
Pacific	19	19	12	29	14	17	[9] 10	5	9	12

INFLUENZA DEATH RATES

	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929
91 cities	1	3	3	1	1	3	[3] 3	3	[4] 4	2
New England	0	0	0	0	0	0	0	2	[5] 0	0
Middle Atlantic	0	2	2	1	2	2	3	3	3	2
East North Central	1	4	1	1	0	2	[6] 1	4	4	2
West North Central	0	0	3	6	3	3	0	0	3	0
South Atlantic	5	4	9	0	0	0	7	2	[7] 7	2
East South Central	0	15	0	0	0	22	0	0	7	0
West South Central	0	8	0	0	0	12	4	8	8	4
Mountain	0	9	17	0	0	17	9	9	[8] 0	9
Pacific	3	0	6	0	0	3	[9] 10	0	3	0

PNEUMONIA DEATH RATES

	Aug. 2, 1930	Aug. 3, 1929	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929
91 cities	53	54	53	53	55	57	[3] 47	54	[4] 53	54
New England	38	43	42	38	38	52	51	25	[5] 48	49
Middle Atlantic	62	61	59	60	72	71	55	60	60	61
East North Central	44	47	47	43	28	35	[6] 28	47	50	51
West North Central	47	39	44	45	27	33	35	48	38	33
South Atlantic	60	51	66	41	68	62	48	73	[7] 52	56
East South Central	59	75	52	60	59	90	74	37	52	52
West South Central	61	78	57	121	92	78	61	66	38	98
Mountain	60	61	69	61	120	35	51	52	[8] 53	44
Pacific	46	50	43	41	49	72	[9] 67	50	55	28

[2] Montgomery, Ala., not included.
[3] Racine, Wis., and San Francisco, Calif., not included.
[4] Hartford, Conn., Columbia, S. C., and Helena, Mont., not included.
[5] Hartford, Conn., not included.
[6] Racine, Wis., not included.
[7] Columbia, S. C., not included.
[8] Helena, Mont., not included.
[9] San Francisco, Calif., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended August 23, 1930.—The Department of Pensions and National Health reports cases of certain communicable diseases in Canada for the week ended August 23, 1930, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia			8	2		1
New Brunswick						3
Quebec	1		1	1	1	19
Ontario	10		1	50	4	17
Manitoba				2		1
Saskatchewan				2	8	3
Alberta	1			12		1
British Columbia	1	2			2	6
Total	13	2	10	69	15	51

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended August 30, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended August 30, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	1
Chicken pox	14	Poliomyelitis	1
Diphtheria	27	Scarlet fever	30
Erysipelas	1	Tuberculosis, pulmonary	45
Influenza	1	Typhoid fever	28
Lethargic encephalitis	1	Whooping cough	32
Measles	3		

CHINA

Canton—Meningitis.—During the week ended August 9, 1930, 4 cases of meningitis, with 1 death, were reported in Canton, China. No cases or deaths were reported in Canton during the two weeks ended August 23.

UNION OF SOUTH AFRICA

Cape of Good Hope Province—Plague.—According to a recent report, 1 death from bubonic plague, with pneumonic complications, occurred on July 16, 1930, at Touws River, Cape of Good Hope Province, in a native who had walked to that place from Willowvale, by way of Laingsburg. It is thought that infection was conveyed by fleas from infected rodents picked up in the Prince Albert or Laingsburg Districts where plague infection in veld rodents exists. Contacts of the case have been isolated and all necessary precautions have been taken.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	Sept. 6, 1930
Afghanistan	C										1 P						P		
China:																			
Canton	C				3		2				2	1							
Manchuria—Dairen	C	1																	
Swatow	C				3	4	3							1					
India	C	5,914	10,817	41,462	56,311	10,088	10,103	10,162	6,767	6,728	5,520								
	D	3,371	5,866	27,906	44,878	7,802	7,110	6,455	4,344	3,712	3,095								
Bassein	C			7	7														
	D			5	5														
Bombay	C		4												2				
Calcutta	C	269	354	647	609	78	78	94	77	81	53	49	37	18	10	17			
	D	153	220	414	372	44	36	36	63	54	28	23	23	7	7	10			
Negapatam	C						1												
	D						1												
Rangoon	C	3	2	1	9	1	1	2	2	1									
	D	1	2	1	3	1	1	1	1	1									
India (French):																			
Chandernagor	C	4	1	6	6			1	2			1							
	D	2	3	5	6			1	1										
Karikal	C	4	12	1					3										
	D	1	9	1					3										
Indo-China (see also table below):																			
Pnompenh	C	9		2	1	5	10	11	14	9	16	7		5	3	3			
	D	7	6		5	1	4	7	6	6	9	5	2	3	2	1			
Saigon and Cholon	C	5	14	76	160	17	19	7	5	7	1	1	1	2	2	1			
	D	4	6	55	101	11	10	2		3					1				

Philippine Islands:[2]																			
Ports—																			
Cebu	C								1	20	13	13	9	5	4			1	1
	D									9	7	12	8	4	4			1	1
Iloilo	C										1	11	17	9	19	32	4	3	4
	D											9	13	10	18	19	9	4	5
Manila	C				1										1			16	13
	D																	5	6
Provinces—																			
Antique	C													14	4		3	2	21
	D													7	4		2	1	10
Bohol	C														45	67	31	24	26
	D														26	37	15	11	11
Bulacan	C					1			2		1	1	2	1				1	1
	D					1												1	
Capiz	C											2	1	1	1			1	
	D											1	1	1	1				
Cebu	C				1	13	26	118	198	313	222	115	63	55	37	4		1	16
	D				1	11	23	50	86	131	83	60	29	32	27	3		1	6
Iloilo	C							1	1	20	45	85	159	143	227	176	88	74	57
	D								1	10	23	64	96	77	164	119	64	51	44
La Union	C										1								
Leyte	C							21	26	11									
	D							12	7	11									
Masbate	C								10	14	32	25	21	15	27				
	D								3	2	18	5	10	5	11				
Misamis, Occidental	C									1	2								
	D									1	2								
Negros, Occidental	C				10	5	55	50	30	62	163	172	171	151	99	50	72	40	47
	D				7	2	27	36	23	42	90	122	114	97	72	34	47	31	32
Negros, Oriental	C									1	1	6	15	6	2				
	D										1	3	9	1	3				
Nueva Acija	C												1						
	D												1						
Pampanga	C							1	1	2								1	
Pangasinan	C									2		1		1					
	D									2				1					
Rizal	C						1				1								
	D						1				1								
Samar	C														5	4	10		
	D														5	3	8		
Surigao	C														15	4	21	3	
	D														9	2	10	3	
Tarlac	C													1					

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.
[2] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930				July, 1930				August, 1930					Sept. 6, 1930
						7	14	21	28	5	12	19	26	2	9	16	23	30	
Siam	C	7	1	29	33	8	10	6	3	8	3	8							
	D	4		13	21	3	9	4	3	4	1	3							
Bangkok	C	2	2	15	9	5	3	3	1		3	4	1	1		1			
	D		1	4	3		3		2		1	1	1	1		1			
Nagara Pathom	C	1		10															
	D	1		2															
Songkla	C										8		2						
	D										4		2						
On vessel:																			
S. S. at Suva, Fiji Islands	C	1																	
S. S. Sutley at Batavia, from Calcutta	C	1																	
S. S. Sassari at Massoua, from Jeddah	C				1														
	D				1														
On small boat at Port Cebu, from Bantayan Island	C					1													
	D					1													

Place		January, 1930	February, 1930	March, 1930	April, 1930			May, 1930			June, 1930			July, 1930		
					1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31
Indo-China (French) (see also table above):																
Annam [1]	C	1	4	52			60		20	3	2	14				1
Cambodia [1]	C	147	90	81	18	6		5	31	52	56	88				43
Cochin-China [1]	C	177	65	82	48			188	224	259	147	126				46

[1] Reports incomplete.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930 7	June 14	June 21	June 28	July, 1930 5	July 12	July 19	July 26	August, 1930 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30
Algeria:																		
Algiers	C										1	2			1			
Constantine	C					1				1								
Oran	C											2	1		1		1	
Argentina:																		
Andalgala.[1]																		
Villa Lia	D	2																
Azores: Ponta Delgada	C			8														
	D			5														
Belgian Congo	C									2				1		1		
	D									2				1		1		
British East Africa (see also table below):																		
Tanganyika	C	7		44														
	D			20														
Uganda	C	47	98	117	227	121	77	105	103		50							
	D	43	87	105	195	75	70	93	90		47							
Canary Islands: Las Palmas	D														1			
Ceylon:																		
Colombo	C	3	4	1	6	1				1	2					1		
	D	3	4	1	5	1				1	2					1		
Plague-infected rats		3	2	4		1												
Chile: Antofagasta	C	1	1	1														
	D		2	1														
Dutch East Indies:																		
Batavia and West Java	C	153	124	87	82	19	27	28	24	19	25	18						
	D	150	122	81	82	19	27	28	24	19	25	18						
Plague-infected rats		3	3	8	5	3	1								1			
Java and Madura	D	296	223	173	185	40	55	56										
Ecuador (see table below).																		
Egypt:																		
Alexandria	C	1	4	2	13	3	6	6	4	8	8	3	4	2	2	4	3	3
	D		1	2	3	2		2	5	2	3	2	3	2	1	3		5
Assiout	C			14	20	4	2	3		1	1							
	D			5	5		1		2	1	1							
Beheira	C		4															
Beni-Suef	C		4														1	

[1] On Mar. 11, 3 deaths from bubonic plague were reported in Andalgala, Catamarca Province, Argentina, since Feb. 5, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930 7	June 14	June 21	June 28	July, 1930 5	July 12	July 19	July 26	August, 1930 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30
Egypt—Continued.																		
Dakahlieh	C	8	5	5	11	1												
	D		1		2													
Gharbieh	C			1										3				
	D			1										1				
Girga	C			1							1							
Minieh	C				7	1	1	4	4	2	1							
	D				1		1											
Port Said	C			1	2	1			1				1	1				
France:																		
Marseilles	C																	2
St. Ouen	C											1						
	D											1						
Gambia	C																4	
Greece (see also table below):																		
Patras	C		1					1				1						
Pyrgos	C		1															
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats								1										
India	C	5,639	4,087	2,215	648	55	59	62	64	70	75							
	D	3,940	3,344	1,960	635	42	52	43	50	46	46							
Bassein	C		3															
	D		1															
Bombay	C	1	7	4	6	1		2					1					
	D	1	5	8	5			1	1				1					
Plague-infected rats		31	86	108	81	6	7	8	5	13	14	10	15	10	8	9		
Madras Presidency	C	230	157	44	38	26	10	3		10	1	10				7		
	D	140	87	19	11	15	2	5		4	1	9				1		
Rangoon	C	7	3	5	4				1				2	2	1			
	D	6	3	4	3				1				2	1	1			
Plague-infected rats		7	3	4	5			1		2	2		2	4		2		
India (Portuguese)	D				7													

Indo-China (see also table below):																		
Pnompenh	C			3	3	6					1	1			2			
	D	13	13	4	1	5	1		1		1	1						
Saigon and Cholon	C		1		1	1		1										
	D		1					1										
Iraq: Baghdad	C	6	7	6	37	12	4	8	4	10	4	2	2	4	3	2		
	D	1	4	2	18	7	3	5		5		1	1		2	1		
Japan: Osaka (vicinity of)—Plague-infected rats		6	4	3														
Kwang-Chow-Wan	C	25	7	37	34	23		8								4		
Madagascar (see also table below): Tamatave	C			1		1												
Morocco	C	48	55	121	71	2		1					1		8			
	D	13	18	45	34	4									1			
Nigeria: Lagos	C	7	13		2	1		3	1	1				2	1			
	D	7	5		2	1		3	1	1				2	1			
Plague-infected rats		42	25	7	17	1	4	1	5	2	3	6						
Senegal (see table below).																		
Siam	C	17	16	5	5													
	D	13	15	6	4													
Bangkok	C	1	5		5									1	2			
	D	1	4		4										2			
Nagara Pathom	C	5	1	10														
	D	6	1	9														
Nagara Rajsima	C	2	1	1										1				
	D		1	1										1				
Syria: Beirut	C						2	5	5		2	4	3		1		1	3
Tunisia:																		
Siax district	C	22		1	21	6		3					6		1			
Tunis	C	5	1	4	1		1				1	4						
	D					1					1							
Union of Socialist Soviet Republics:																		
Salsk Region	C					1			1									
	D					1												
Stavropol Region	C					1												
	D					1												
Union of South Africa:																		
Cape Province	C	2	1		P	1												
	D	1	1													1		
Orange Free State	C	11	5	1														
	D	3	3															
Transvaal	C	2	1															
	D		1															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
British East Africa (see also table above):							
Kenya	C	69	85	16	171	107	36
Urganda	C	109					50
	D	90					47
Ecuador: Guayaquil	C	2	2	0	0	0	
	D	2	0	0	0	0	
Plague-infected rats		0	2	0	0	0	
Greece (see also table above)	C			1		1	
Indo-China (see also table above)	C	30	27	4		11	1
Madagascar (see also table above):							
Ambositra Province	C	49	25	14	1		
	D	41	20	12	1		
Antisirabe Province	C	22	38	46	19		
	D	22	36	45	19		
Itasy Province	C		4				
	D		4				
Miarinarivo Province	C	25	14	1	5	1	
	D	25	14	1	5	1	

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
Madagascar—Continued.							
Moramanga Province	C	7	5	3	1	3	
	D	4	5	3		3	
Tananarive Province	C	110	52	39	15	6	
	D	107	52	38	14	6	
Senegal:							
Baol [1]	C		18	24	13	2	62
	D		8	12	11	2	48
Dakar [1]	C			2	52	53	140
	D			2	42	117	122
Louga [1]	C	2		33	54	60	138
	D			10	27	21	103
Thies [1]	C		3	12	21	52	54
	D		2	9	8	35	30
Tivaouane [1]	C		11	71	135	43	119
	D		8	38	69	28	70

[1] Incomplete reports.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16	23
Algeria:																	
Algiers	C	1	5	1	3						1						
Constantine	C							1				1					
Oran	C		1														
Arabia: Aden	C	2	3	1						1							
Bolivia: La Paz.[1]																	
British Borneo: Sarawak	C	19															

British East Africa (see also table below).																	
Tanganyika	C	49	103	57	409	385	755	196	274	64	4						
	D	8	7	14	70	154	90	31	26	13	2						
British South Africa:																	
Northern Rhodesia	C		9	1	59												
	D			2	9												
Southern Rhodesia	C	6		66	155	75	1	3		1	12	18					
	D			1	13												
Canada:																	
Alberta	C	4	10	4							2	1	2	1			
Edmonton	C	1	4	3													
British Columbia—Vancouver	C	16	20	17	4	1	1			2	2	1	1	1	1		2
Manitoba	C	2	4	4	10			4									
Ontario	C	86	100	77	82	14	10	13	10	3	5	6	10	8		3	4
North Bay	C	1			1												
Ottawa	C	11	19	21	25	6		8	1	1	1	4	7	5	1	1	
Toronto	C				4	2	1	1			1						
Quebec	C								4	3							
Montreal	C													7			
Saskatchewan	C	76	47	41	39		12	10			2		3				8
Regina	C				4												
Ceylon:																	
Angoda, Western Province	C	10		6													
	D	1		2													
Colombo	C	3															
	D	2															
China:																	
Canton	C	11	6	3		1											
	D	3	2	3													
Chungking	C	P		P	P	P			P	P	P	P	P				
Foochow	C	P		P	P		P		P								
Hong Kong	C	62	38	18	12	2	1	1			2						
	D	51	25	23	9	1		1	1		1						
Manchuria—																	
Harbin	C			1	20												
Kwantung—Dairen	C	5		2	8		11	5		8							
	D				4			1									
Nanking	C	P	P	P	P	P	P				P	P	P	P			
Shanghai—																	
Foreigners only	C	2	2	3	2	1	1	1	2	1	1	1	1	3			
Including natives	D	7	10	10	5	1		1	1								
Swatow	D	6	6	3	6	1		1	2	1				1			
Tientsin	C	1	2	2	1												
Chosen (see table below).																	
Colombia:																	
Barranquilla	C	102	2	1													
Buenaventura	C	1		15	4	1	1		4	4	3	2	1				
Costa Rica:																	
Port Limon	C			6	2	2											
San Jose [2]	C		10	7	2												

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930				July, 1930				August, 1930			
						7	14	21	28	5	12	19	26	2	9	16	23
Curacao (alastrim)	C		14	2	2		1			2							
Dutch East Indies:																	
Borneo	C		185	90	16	2	10				2						
	D		12	31	1		1										
Java—																	
Batavia and West Java	C	14	78	64	12	1	4	6	2	3	1	3	1	1		1	
	D	7	6	11	7		1	2		2	1	1	1	1		1	
East Java and Madura	C			4								1					
Sanggi Islands	C	12	5	160	26												
	D		1	24	5												
Sumatra	C		48														
	D		5														
Egypt: Port Said	C			1	1						2		1				
Great Britain:																	
England and Wales	C	1,530	1,700	1,427	1,417	237	266	241	182	156	138	126	109	70	86	95	
Ashton under Lyne	C	29	15	18	17			3	4		4	2	2				
Bradford	C	2		3	2					1							
Cardiff	C		2	3						2							
Leeds	C	11	16	2						1							
London	C	699	710	602	637	130	136	125	107	84	52	62	48	36	50	41	
London and Great Towns	C	1,156	1,239	1,066	1,078	197	208	190	158	127	96	102	83	61	73	71	
	D	5	3	3													
Sheffield	C		8	2													
Stoke-on-Trent	C	41	122	85	62	3	10	15	4	3	2	1	3	1	1		
Scotland	C					1		3			1						
	D										1						
India	C	36,036	39,329	34,843	22,835	3,686	3,550	3,174	2,552	2,258	2,006						
	D	7,710	9,109	6,983	5,451	1,065	913	905	648	733	580						
Bombay	C	638	718	430	218	36	35	23	19	17	15	11	7	6	2		
	D	314	431	270	161	27	23	19	10	13	9	9	2	5	2		
Calcutta	C	399	361	495	302	46	45	45	25	27	19	13	14	4		12	
	D	287	305	403	258	50	37	29	30	17	17	12	10	4		8	
Cochin	C	184	291	183	37	4	1	10	1			4	2	2	4	4	
	D	29	35	13	8	2	1	1									

Karachi	C	38	33	30	14	5		1	1				1	2		2	
	D	16	47	17	4	2		1						2		1	
Madras	C	159	173	133	72	9	10	8	8	6	10	17	16	19		9	
	D	29	36	27	15	6	3	1		4	1	3	4	3		5	
Moulmein	C	143	146	43	89		9	6	6	4	10	3	1				
	D	40	41	7	21		3	3	1	3	4	1	2				
Negapatam	C	1			1		1		1			1		2		2	
Rangoon	C	7	10	4	6	1	5	1	2	2	1	1		1	1		
	D	2	5		1			1	1								
Tuticorin	C				5			1									
Vizagapatam	C	9	69	6	5		1										
	D	1	18	2	3												
India (French):																	
Chandernagor	C	11	6	10	24	4	8	5	2	3	1	4					
	D	5	2	2	7			2	1	1	1	1					
Karikal	C	12	24	19	12	4	3	1	3	1		1					
	D	8	7	8	3	2	2	1	3	1		1					
Pondicherry Province	C	52	21	24	40	4	4	9	6	4	9	8	5				
	D	40	13	20	36	4	4	9	6	3	9	8	5				
India (Portuguese)	C	50	38	44	47		3	18	7	1							
	D	5	2	8	8		2	2	6								
Indo-China (see also table below):																	
Pnompenh	C				3							1					
	D			2		1						1				1	
Saigon and Cholon	C	4	3	5	3	1											
	D	2	1	5	2									1	1	1	
Iraq:																	
Baghdad	C	3		8	1	1				1	1	1				1	
	D	1		1	1							1				1	
Basra	C	1		1													
Mossoul Liwa	C	12		22	21		1		3	47	20						
	D	2		3	3		1			19	1						
Ivory Coast (see table below).																	
Jamaica (alastrim)	C				2												
Japan: Tokyo	C			1													
	D			1													
Macao	D	2	3	2	1												
Mexico (see also table below):																	
Jalisco (State) Guadalajara	D	14	22	20	7	4		5	6	3	1				1		
Juarez	C	3	2					6									
	D	1						1									
Mexico City and surrounding territory	C	38	106	99	80	17	23	20	17	10	12	4	11	2	3		
	D	21	31	47	32	5	4	3	5	2	3	1	2	1	3		
Progreso	C				1												
	D				1			1									
San Luis Potosi	C	1															
	D	1															
Morocco (see table below).																	
Nigeria: Lagos	C	2	1	1					1								

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 1–31, 1930	Week ended— June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9	Aug. 16	Aug. 23
Philippine Islands: Sarangani and Balut Islands	C	3															
Poland	C	2		7	3												
Portugal: Lisbon	C	7	7	8	8	1		2	7		7		6		6	5	
Rumania	C	1	2														
Siam	C	2		8	2					2		4					
	D			4								3					
Somaliland, British: Boales	C	19	2														
	D	2	6														
Spain	C						4		8		1	1	3	2			
Straits Settlements	C		5	5	11	5		1	3	1	2	7	1	1	1	1	
	D		1	2	3	1		1		1	1	1				1	
Sudan (Anglo-Egyptian)	C	79	60	42	19	4	8	1	54	8	1		3				42
	D	6	5	4	2				3		1						3
Sudan (French) (see table below).																	
Switzerland: Berne Canton	C												1	1			
Syria (see table below).																	
Taiwan: Taihoku (see table below).																	
Tunisia: Tunis	C	3	3	4	2			2					1				
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P												
Orange Free State	C	P	P														
Transvaal	C	P	P														
Upper Volta	C	26	2	3	1			8	5								
Zanzibar	C		13														
On vessel:																	
S. S. Tairoa, at Liverpool, from London	C	1															
S. S. Karagola, at Lourenco Marques, from India	C	1															
S. S. Elysia, at Port Sudan, from Bombay	C			1													
S. S. Naldera, at Port Said	C				1												
S. S. Manoa, from Honolulu to San Francisco	C								1								

Place		January, 1930	February, 1930	March, 1930	April, 1930 1-10	April, 1930 11-20	April, 1930 21-30	May, 1930 1-10	May, 1930 11-20	May, 1930 21-31	June, 1930 1-10	June, 1930 11-20	June, 1930 21-30	July, 1930 1-10	July, 1930 11-20	July, 1930 21-31
Indo-China (see also table above)	C	460	434	26	261				173	132	80	133				238
Ivory Coast	C			7												
Sudan (French)	C	229	213	609	371		150	40	56	178	76				34	
	D	25	11	49	30		6	7	7	18	18					
Syria: Beirut	C	70	18	17	10	2	7			7	6	1				2
Taiwan: Taihoku	C		43	58	10	2										

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
British East Africa (see also table above):							
Kenya	C	12	12	175	174	171	142
Uganda	C	184	109			78	
	D	155	99			69	
Chosen	C	1	4		5	2	
	D		1		1	1	
France	C	9	23	8		3	
Mexico: Durango (see also table above)	D	12	6	5	4	4	3
Morocco	C	29	74		10	18	5
Turkey	C	215	114		3	16	
	D	66	42				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	Week ended— May, 1930: 10	May 17	May 24	May 31	June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9	Aug. 16	Aug. 23
Algeria:																				
Algiers	C	4	6	8	1	2	4	8	2		1			1	2	3				
Constantine Department	C	5	11	15		4		2	11		1			1	1					
Oran	C							3				4		2	1			1		
Arabia: Aden	C		1																	
	D		1																	
Bolivia: La Paz.[1]																				
Brazil: Porto Alegre	C	2			1															
Bulgaria	C	13	9	15	1		5		1		9	6		4	5	1		1		
	D	1		1	1		1		1						1					
China:																				
Manchuria—Harbin	C	1	4	52					2											
Shanghai	C		1																	
Chosen (see table below).																				
Czechoslovakia (see table below).																				
Egypt:																				
Alexandria	C			1							1	1	1						1	
Beheira Province	C	18	2	2	9	21	9	10	17	16	7	5		5	1	9				
	D	5			4	4	4	1	1	1		2		1		1				
Cairo	C	1															2			
Port Said	C	1																		4
Great Britain: Scotland—																				
Dunfermline	C													1						
Glasgow	C					1														
	D					1														
Greece (see table below):																				
Iraq: Baghdad Liwa	C		2																	
Ireland:																				
Irish Free State—																				
Galway County—Oughterard	C															2				
Kerry County—Dingle	C			5																
Leitrim County—Mohill	C											9				1				
Mayo County—																				
Ballina	C							2		1				1						
Swinford	C					7	7													
Westport	C														2		1			

Roscommon County—																				
Roscommon	C													1						
Strokestown	C													1						
Wicklow County—Shillelagh	C								1		3	1		1						
Northern Ireland—Cookstown	C	3																		
Latvia (see table below).																				
Lithuania (see table below).																				
Mexico: Mexico City, including municipalities in Federal District	C	9	4	4		2		4	2	3	1	3	2		2	1	2	2		
	D		1	4				3		1							1	1		
Morocco	C	21	38	15	3	6	1	1	1		6	8		4	3	4				
	D		7	3																
Palestine	C	1	6	1		2			2				3	1	1	1		1	1	
Poland	C	183	228	243	64	45	34	23	39	15	26	37		24		12	10	15		
	D	8	13	15	2	2		1	3	3	2	3		4			1			
Portugal:																				
Lisbon	C			4																
Oporto	C	1	2	1															1	
Rumania	C	293	185	186	69	58	61	48		32	26									
	D	23	12	11	10	11	6	8		3	2									
Spain: Valencia	C									2		1		3						
	D													1						
Tunisia	C	3			2	2	1	1			2	16			14	10	2	5		
Turkey (see table below).																				
Union of South Africa:																				
Cape Province	C	P	P	P	P	P	P	P			P	P	P	P						
Natal	C	3	P	P	P	P		P			P		P	P						
Orange Free State	C	P	P		P	P	P	P			P	P	P	P						
Transvaal	C			P																
Yugoslavia (see table below).																				

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
China: Harbin	C			37	204	240	
Chosen: Seoul	C		17		3		
Czechoslovakia	C	10	2	42	29	12	
Greece: Athens	C	12	6	3	1	3	
Latvia	C	18				3	3

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
Lithuania	C	2	70	62	73	27	16
	D		5	4	4		
Turkey	C	2	3	1	3	16	2
Yugoslavia	C	26	33	46	22	16	6
	D	3	5	2	4	1	

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

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UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

BY THE UNITED STATES PUBLIC HEALTH SERVICE

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Mortality From Influenza and Pneumonia in 50 Large Cities of the United States, 1910–1929

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

VOL. 45 SEPTEMBER 26, 1930 NO. 39

MORTALITY FROM INFLUENZA AND PNEUMONIA IN 50 LARGE CITIES OF THE UNITED STATES, 1910-1929[1]

By SELWYN D. COLLINS, *Associate Statistician*, W. H. FROST, *Consultant*, MARY GOVER, *Associate Statistician*, and EDGAR SYDENSTRICKER, *Statistician, United States Public Health Service.*

DATA FOR GROUP OF CITIES

The course of recorded mortality from influenza and pneumonia[2] from 1920 to 1929 in a group of 95 American cities and in subgroups corresponding to the major geographic subdivisions of the United States has been considered in a prior paper.[3] The purpose of the present study is to give a similar account of mortality from these causes through the two decades from 1910 to 1929, inclusive, a period which is of special interest, since it includes the influenza epidemic of 1918–19 with approximately 10 years preceding and 10 years following.

Continuous records of deaths from influenza and pneumonia by weeks prior to 1920 are not available for all of the 95 cities which furnished material for the previous study; and for the period prior to September, 1918, weekly mortality statistics by specific causes are not available in assembled form for any considerable group of cities. Therefore, the study here presented is necessarily limited to a smaller number of cities than was included in the previous paper, and that part of the study for the period prior to September, 1918, is based upon deaths recorded not by weeks but by months only. The data used and the sources are as follows:

(1) From the Weekly Health Index, issued by the United States Census Bureau, and from weekly reports from cities of cases and deaths from certain causes as published in the Public Health Reports, statistics of deaths from influenza and pneumonia by weeks, from September, 1918, through 1929 in 35 cities, each of which had more than 100,000 inhabitants in 1910.

(2) From the annual volumes of Mortality Statistics, United States Census Bureau records of the deaths from the same causes in these same 35 cities by *months* from 1910 to 1929.

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[1] From the Office of Statistical Investigations, United States Public Health Service.

[2] In this paper the term "influenza and pneumonia" designates the classifications in the recorded mortality that were used and is not intended to suggest that the various respiratory epidemics were necessarily etiologically the same.

[3] Collins, S. D.: Influenza-pneumonia mortality in a group of about 95 cities in the United States, 1920-1929. Pub. Health Rep., vol. 45, No. 8, Feb. 21, 1930. (Reprint No 1355).

(3) From the same volumes of Mortality Statistics, similar monthly records of deaths from influenza and pneumonia for the same period in the 15 other cities in the United States which had in 1910 a population of 100,000 or more.

Wherever, in this study, mortality in a group of cities is considered, the group referred to is made up of the 35 cities mentioned under (1) and (2), the additional 15 cities which are included in certain tables being used only for the study of mortality in individual cities.

The 35 cities which constitute the principal group for study were chosen for this purpose primarily because they are the only cities in the country for which continuous weekly statistics of deaths from influenza and pneumonia are available from the beginning of the 1918 influenza epidemic. This group includes 25 of the 33 cities of the United States which, in 1920, had populations exceeding 200,000 and comprises more than half of the 68 cities which, in that year, had 100,000 or more inhabitants. The total population of the group, as enumerated in the census of 1920, was 20,440,548, and as estimated [4] for 1928 was 23,421,000. Nearly 44 per cent of this aggregate is contributed by New York, Philadelphia, Boston, and Baltimore, and a large proportion of the remainder is in other cities located in the northeastern quarter of the country. Thus, in geographic distribution the population represented by this group is unlike that of the United States as a whole, and differs considerably from that of the population resident in the 95 cities which were used for the study of mortality from 1920–1929. However, it is found by numerous comparisons that, in the decade from 1920 to 1929, the course of mortality as exhibited in the 35 cities is not substantially different from that found in the larger group of 95 cities; and it may be inferred that this holds true also for the years 1910 to 1919.

Basic data for the group as a whole are presented for the period September, 1918, through 1929, in Tables 1, 2, and 3, which show, respectively, mortality rates (annual basis) by weeks from (1) influenza, (2) pneumonia, and (3) influenza and pneumonia together. Corresponding mortality rates (also on an annual basis) by months from 1910 to 1919 are shown in the three sections of Table 4.

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[4] Provisional enumerated populations now being announced for 1930 indicate that this estimate is less than 3 per cent in error.

TABLE 1.—*Weekly death rates (annual basis) per 100,000 from influenza in a group of 35 cities*[1] *in the United States, 1918–1929*

Week of year	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
1	-------	458	14	5	11	19	10	19	22	19	19	182
2	-------	507	18	9	9	30	13	20	23	21	21	209
3	-------	551	115	10	9	41	14	24	21	21	26	141
4	-------	535	417	12	15	44	13	19	29	27	18	130
5	-------	422	665	8	35	64	16	28	40	20	20	77
6	-------	302	683	10	56	77	19	25	36	26	16	57
7	-------	238	455	14	67	90	18	31	55	26	21	51
8	-------	220	278	12	98	102	19	33	46	23	23	43
9	-------	227	150	12	83	102	18	30	56	28	20	34
10	-------	221	99	15	69	84	21	33	74	28	22	30
11	-------	217	64	16	65	62	21	41	80	32	23	30
12	-------	182	51	11	48	42	15	35	101	28	28	26
13	-------	154	31	9	33	38	16	34	87	24	25	15
14	-------	110	24	9	21	33	16	27	70	25	33	20
15	-------	91	22	10	22	27	17	28	46	22	29	14
16	-------	86	18	9	16	25	14	31	35	19	28	16
17	-------	54	14	10	11	20	11	21	30	18	32	11
18	-------	50	13	7	11	17	9	14	25	13	35	6
19	-------	33	10	5	9	10	9	16	16	12	35	9
20	-------	25	7	5	4	8	10	14	14	11	30	9
21	-------	19	10	4	5	6	8	13	11	9	25	11
22	-------	16	7	3	3	7	5	12	7	9	19	8
23	-------	13	4	3	2	4	4	6	10	5	16	7
24	-------	7	3	3	4	4	4	5	8	6	12	6
25	-------	6	2	2	2	2	4	6	5	7	7	6
26	-------	3	3	2	1	3	3	4	7	3	9	4
27	-------	3	2	2	2	3	2	2	4	4	9	2
28	-------	2	2	1	2	2	3	2	6	3	5	2
29	-------	2	2	1	1	3	0.2	3	3	3	4	4
30	-------	1	3	1	1	1	1	1	2	3	4	2
31	-------	2	3	1	1	1	3	3	3	2	5	2
32	-------	2	2	1	1	1	2	3	2	4	5	2
33	-------	1	1	2	1	2	2	2	3	4	3	4
34	-------	2	1	2	1	2	1	3	4	5	4	4
35	-------	3	1	2	1	1	2	3	3	5	4	2
36	-------	2	2	1	1	1	1	5	4	4	3	3
37	5	3	2	2	2	3	1	5	5	4	4	2
38	49	5	2	1	1	3	1	3	5	3	4	2
39	213	6	2	2	2	3	4	5	6	7	6	5
40	670	7	3	3	1	2	4	3	4	6	8	7
41	1,685	8	1	3	2	4	5	6	6	6	7	8
42	3,037	6	3	3	3	5	5	9	7	11	17	7
43	3,159	8	3	5	4	5	3	11	10	9	11	9
44	2,366	5	4	5	6	4	8	12	12	10	10	11
45	1,253	6	4	4	4	7	7	11	14	7	12	9
46	674	6	6	5	8	8	8	9	11	9	14	9
47	475	8	6	4	8	9	9	8	12	11	17	7
48	400	7	6	5	7	9	11	12	14	13	30	11
49	472	10	9	6	8	11	13	14	18	11	46	17
50	603	10	8	5	10	9	17	14	16	14	79	16
51	656	10	5	6	9	10	16	13	16	17	114	18
52	548	9	9	7	12	9	16	15	18	20	152	18
53	-------	9	------	------	------	------	19	------	------	------	------	------

[1] Aggregate enumerated population in 1920 census, 20,440,548; aggregate estimated 1928 population, 23,421,000. For list of cities, see footnote to Table 3.

Dates of end (Saturday) of first calendar week of the year

Year	First week ended—	Year	First week ended—	Year	First week ended—
1917	Jan. 6	1922	Jan. 7	1927	Jan. 8
1918	Jan. 5	1923	Jan. 6	1928	Jan. 7
1919	Jan. 4	1924	Jan. 5	1929	Jan. 5
1920	Jan. 10	1925	Jan. 10	1930	Jan. 4
1921	Jan. 8	1926	Jan. 9		

Table 2.—*Weekly death rates (annual basis) per 100,000 from pneumonia in a group of 35 cities*[1] *in the United States, 1918–1929*

Week of year	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
1	-------	335	186	182	159	230	159	202	220	196	179	342
2	-------	354	217	173	186	251	202	207	216	189	153	369
3	-------	378	327	176	193	245	192	199	203	187	181	367
4	-------	427	553	172	198	251	178	200	180	159	161	345
5	-------	399	722	178	238	294	206	214	215	175	156	289
6	-------	336	819	189	261	310	205	218	214	153	177	243
7	-------	323	609	194	269	356	200	211	262	153	176	222
8	-------	350	405	199	325	371	214	198	262	172	155	191
9	-------	364	287	208	298	374	207	202	249	179	198	229
10	-------	341	244	191	290	323	219	209	334	194	199	200
11	-------	341	215	184	261	264	210	207	392	188	230	186
12	-------	311	199	167	223	231	200	197	388	167	208	166
13	-------	275	182	153	185	205	212	202	342	166	226	155
14	-------	247	179	150	184	197	218	195	275	172	226	150
15	-------	231	183	135	166	202	168	188	236	157	207	138
16	-------	203	178	129	147	173	200	207	207	164	196	128
17	-------	167	162	110	133	171	185	166	173	144	200	115
18	-------	153	141	110	149	163	172	157	164	130	219	121
19	-------	153	134	97	131	143	147	126	154	124	212	107
20	-------	118	145	100	132	129	137	125	140	108	199	107
21	-------	125	121	93	113	119	116	128	124	108	179	116
22	-------	109	109	79	92	110	118	133	104	96	155	108
23	-------	100	93	71	87	108	106	105	96	97	132	92
24	-------	76	85	59	69	79	110	81	89	88	115	88
25	-------	59	61	63	56	73	95	69	74	78	90	84
26	-------	55	60	48	62	80	82	60	73	75	77	63
27	-------	52	49	44	52	67	64	62	68	50	69	63
28	-------	61	49	45	56	56	60	54	63	61	60	56
29	-------	44	48	39	49	52	60	49	58	59	59	54
30	-------	49	48	41	47	58	59	62	49	49	48	50
31	-------	54	53	48	47	55	56	58	57	49	55	54
32	-------	48	50	48	50	58	48	64	52	57	62	52
33	-------	47	49	53	52	55	51	54	56	45	62	54
34	-------	48	49	43	55	54	46	51	50	48	61	55
35	-------	52	41	58	51	56	59	74	54	57	57	53
36	-------	47	50	56	51	63	64	64	51	60	57	61
37	65	56	59	52	56	52	59	65	48	60	63	53
38	96	56	58	58	52	71	58	50	67	63	67	53
39	189	56	63	57	57	65	72	60	70	57	67	61
40	471	62	59	59	69	71	80	72	64	66	86	75
41	1,077	80	72	65	80	73	96	97	80	73	83	78
42	1,875	72	75	77	81	89	94	96	89	78	106	98
43	1,756	63	80	87	96	90	88	115	100	92	87	107
44	1,144	85	82	95	102	99	88	136	102	90	91	110
45	611	87	92	92	128	118	121	140	107	106	95	109
46	287	89	101	113	119	119	128	147	123	115	107	97
47	271	93	121	101	131	129	123	126	80	95	123	97
48	262	112	133	110	142	122	133	144	131	118	136	106
49	300	128	125	115	150	128	160	128	136	115	162	137
50	370	145	144	126	170	144	169	142	137	121	198	151
51	365	159	142	136	184	146	182	136	146	137	243	153
52	352	160	177	147	196	143	157	183	169	164	287	144
53	-------	186	------	------	------	------	210	------	------	------	------	------

[1] Aggregate enumerated population in 1920 census, 20,440,548; aggregate estimated 1928 population, 23,421,000. For list of cities, see footnote to Table 3.

TABLE 3.—*Weekly death rates (annual basis) per 100,000 from influenza and pneumonia in a group of 35 cities*[1] *in the United States, 1918–1929*

Week of year	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
1	------	793	200	187	170	249	169	221	242	215	198	524
2	------	861	235	182	195	281	215	227	239	210	174	578
3	------	929	442	186	202	286	206	223	224	208	207	508
4	------	962	970	184	213	295	191	219	218	186	178	475
5	------	821	1,387	186	273	358	222	242	255	195	176	366
6	------	638	1,502	199	317	387	224	243	250	179	193	300
7	------	561	1,064	208	336	455	218	242	317	179	197	273
8	------	570	683	211	423	473	233	231	308	195	178	234
9	------	591	446	220	381	476	225	232	305	207	218	263
10	------	562	343	206	359	407	240	242	408	222	221	230
11	------	558	279	200	326	326	231	248	472	220	253	216
12	------	493	250	178	271	273	215	232	489	195	236	192
13	------	429	213	162	218	243	228	236	429	190	251	170
14	------	357	203	159	205	230	234	222	345	197	259	170
15	------	322	205	145	188	229	185	216	282	179	236	152
16	------	289	196	148	163	198	214	238	242	183	224	144
17	------	221	176	120	144	191	196	187	203	162	232	126
18	------	203	154	117	160	180	181	171	189	143	254	127
19	------	186	144	102	140	153	156	142	170	136	247	116
20	------	143	152	105	136	137	147	139	154	119	229	116
21	------	144	131	97	118	125	124	141	135	117	204	127
22	------	125	116	82	95	117	123	145	111	105	174	116
23	------	113	97	74	89	112	110	111	106	102	148	99
24	------	83	88	62	73	83	114	86	97	94	127	94
25	------	65	63	65	58	75	99	75	79	85	97	90
26	------	58	63	50	63	83	85	64	80	78	86	67
27	------	55	51	46	54	70	66	64	72	63	78	65
28	------	63	51	46	58	58	63	56	69	64	65	58
29	------	46	50	40	50	55	60	52	61	62	63	58
30	------	50	51	42	48	59	60	62	51	52	52	52
31	------	56	56	49	47	56	59	61	60	51	60	56
32	------	50	52	49	51	59	50	67	54	61	67	54
33	------	48	50	55	53	57	53	56	59	49	65	58
34	------	50	50	45	56	56	47	54	54	53	65	59
35	------	55	42	60	52	57	61	77	57	62	61	55
36	------	49	52	57	52	64	65	69	55	64	60	64
37	70	59	61	54	58	55	60	70	53	64	67	55
38	145	61	60	59	53	74	59	53	72	66	71	55
39	402	62	65	59	59	68	76	65	76	64	73	66
40	1,141	69	62	62	70	73	84	75	68	72	94	82
41	2,762	88	73	68	82	77	101	103	86	79	90	86
42	4,912	78	78	80	84	94	99	105	96	89	123	105
43	4,915	76	83	92	100	95	91	126	110	101	98	116
44	3,510	90	86	100	108	103	96	148	114	100	101	121
45	1,864	93	96	96	132	125	128	151	121	113	107	118
46	1,061	95	107	118	127	127	136	156	134	124	121	106
47	746	101	127	105	139	138	132	134	92	106	140	104
48	662	119	139	115	149	131	144	156	145	131	166	117
49	772	138	134	121	158	139	173	142	154	126	208	154
50	973	155	152	131	180	153	186	156	153	135	277	167
51	1,021	169	147	142	193	156	198	149	162	154	357	171
52	900	169	186	154	208	152	173	198	187	184	439	162
53	------	195	------	------	------	------	229	------	------	------	------	------

[1] Boston, Fall River, Worcester, Providence, New Haven, Buffalo, New York, Rochester, Syracuse, Newark, Philadelphia, Baltimore, Washington, Richmond, Atlanta, Cincinnati, Cleveland, Columbus, Toledo, Indianapolis, Chicago, Grand Rapids, Louisville, Memphis, Nashville, Birmingham, Minneapolis, St. Paul, Omaha, Kansas City, Mo., New Orleans, Denver, Los Angeles, San Francisco, Portland, Oreg. Aggregate enumerated population in 1920 census, 20,440,548; aggregate estimated 1928 population, 23,421,000. Provisional results of the population enumeration for 1930 indicate that this estimate is less than 3 per cent in error.

TABLE 4.—*Monthly death rates (annual basis) per 100,000 from influenza and pneumonia in a group of 35 cities* [1] *in the United States, 1910–1919*

Month	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
	Influenza									
January	19	25	16	24	16	12	79	32	18	412
February	22	25	15	17	15	20	35	30	18	204
March	24	22	14	16	17	23	20	18	18	162
April	14	14	9	8	13	22	12	11	24	66
May	7	6	4	4	4	7	6	6	10	24
June	3	2	2	2	2	3	3	3	3	9
July	1	1	1	1	1	2	2	1	2	5
August	1	1	1	1	1	1	1	1	2	4
September	1	1	1	1	1	1	1	2	80	6
October	2	3	3	3	2	2	3	3	1,774	7
November	7	5	6	5	3	5	5	6	513	7
December	16	8	16	6	7	42	14	12	445	10
	Pneumonia									
January	285	280	253	250	243	218	347	349	282	436
February	274	259	256	292	264	234	228	312	283	357
March	286	281	253	278	295	274	233	276	365	310
April	241	256	206	205	236	265	196	227	344	196
May	195	181	168	181	176	143	161	196	160	125
June	132	97	109	130	103	113	101	112	83	65
July	95	86	82	83	73	76	78	70	68	50
August	79	76	77	76	67	66	76	65	51	47
September	96	86	79	83	75	76	77	82	187	55
October	120	116	128	106	95	105	107	122	1,816	70
November	192	166	154	153	145	148	152	169	461	97
December	275	208	234	191	193	315	227	217	399	153
	Influenza and pneumonia									
January	304	306	269	274	259	230	426	381	300	848
February	297	284	271	310	279	254	263	342	301	561
March	310	303	267	294	312	297	253	294	383	472
April	255	270	215	213	249	287	207	238	368	262
May	201	187	172	185	180	150	167	102	170	149
June	135	99	111	132	105	116	104	114	85	74
July	96	87	83	84	74	77	80	72	70	55
August	80	77	78	76	68	67	77	66	53	51
September	97	88	79	84	76	76	78	84	267	61
October	123	119	131	109	96	107	1 9	125	3,591	77
November	199	171	160	157	148	153	157	175	974	104
December	291	217	250	197	200	357	241	229	845	162

[1] Aggregate enumerated population in 1920 census, 20,440,548; aggregate estimated 1928 population, 23,421,000. For list of cities, see footnote to Table 3.

Since one of the principal purposes in view is to identify periods of unusual mortality from influenza or pneumonia and at least roughly to estimate the excess deaths therein, a first requisite is to establish some base line from which to measure deviations. A base line, or norm, to serve this purpose, must be adjusted, in the first instance, to the usual or normal seasonal oscillations of mortality, and must also take account of any changes which may have taken place in the general level of mortality during the two decades which are included.

Considering first the question of a general trend, a preliminary study was made of the death rates in corresponding months of successive years from 1910 to 1929. This showed, for each month of the yearly cycle, a lower level of mortality in the second decade. It was found, however, that this was due not to a gradual and consistent

downward trend, but largely to a rather abrupt drop in the death rate immediately following the major epidemic of 1918–19. Thus, during the eight years immediately preceding this epidemic the graph marking the trend of mortality was approximately horizontal, while throughout the post-pandemic period another distinctly lower level was sustained without material change. It has, therefore, been deemed proper to use two norms of mortality—one for the years 1910 to June, 1919, inclusive, and the other for the remainder of the period; that is, July 1, 1919, to December 31, 1929.

For the first period, 1910 to June, 1919, the procedure in deriving a norm was as follows: Death rates in each of the years 1910 to 1916 were computed separately for each month in the seasonal cycle, all the rates being computed on an annual basis. For each month the median rate for the seven years, 1910 to 1916, inclusive, was taken as the norm. The reasons for using the median rather than the mean are sufficiently obvious. Although this norm is used for 1917, 1918, and the first half of 1919, it was considered preferable in deriving the norm to exclude these years to avoid the distorting effect of their obviously abnormal mortalities.

For the period September 8, 1918, to June 30, 1919, for which mortality records are given by weeks, a norm is needed on a weekly rather than a monthly basis. To derive this, the monthly median mortality rates (annual basis) for 1910–1916 were plotted; then a smooth curve was drawn through the points as an interpolation curve. From this smooth curve ordinates read off at intervals corresponding to weeks were taken as median, or normal, weekly rates.

For the postpandemic period, July 1, 1919, through 1929, the norm used is, for each week, the median of the rates for that week in the years 1921 to 1927, inclusive, the series of 52 median rates being smoothed by a 5-period moving average. Since 1920, 1928, and 1929 are years marked by considerable "epidemics," the rates for those years are not used for the derivation of the norm.

Table 5 shows for the group of 35 cities, from September 8, 1918, to the end of 1929, the direction and extent of deviations of observed rates (annual basis) of mortality from influenza and pneumonia from the weekly medians. It also shows the two sets of weekly norms used respectively for the period September, 1918, to June, 1919, and for the time thereafter. Table 6 shows, for each month, 1910 to 1919, the deviations of observed monthly rates (annual basis) of mortality from influenza and pneumonia in the same group of cities.

TABLE 5.—*Excess*[1] *weekly death rates (annual basis) per 100,000 from influenza and pneumonia in a group of 35 cities*[2] *in the United States, 1918–1929*

Week of year	Median 1910–16 (smoothed)[1]	Median 1921–27 (smoothed)[1]	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
1	269	196	-------	+524	+4	-9	-26	+53	-27	+25	+46	+19	+2	+328
2	272	207	-------	+589	+28	-25	-12	+74	+8	+20	+32	+3	-33	+371
3	274	219	-------	+655	+223	-33	-17	+67	-13	+4	+5	-11	-12	+289
4	274	224	-------	+688	+746	-40	-11	+71	-33	+5	-6	-38	-45	+251
5	276	230	-------	+545	+1,157	-44	+43	+128	-8	+12	+25	-35	-54	+136
6	278	235	-------	+360	+1,267	-36	+82	+152	-11	+8	+15	-56	-42	+65
7	280	238	-------	+281	+826	-30	+98	+217	-20	+4	+79	-59	-41	+35
8	285	238	-------	+285	+445	-27	+185	+235	-5	-7	+70	-43	-60	-4
9	291	239	-------	+300	+207	-19	+142	+237	-14	-7	+66	-32	-21	+24
10	296	237	-------	+266	+106	-31	+122	+170	+3	+5	+171	-15	-16	-7
11	297	236	-------	+261	+43	-36	+90	+90	-5	+12	+236	-16	+17	-20
12	293	234	-------	+200	+16	-56	+37	+39	-19	-2	+255	-39	+2	-42
13	283	224	-------	+146	-11	-62	-6	+19	+4	+12	+205	-34	+27	-51
14	269	214	-------	+88	-11	-55	-9	+16	+20	+8	+131	-17	+45	-44
15	254	205	-------	+68	0	-60	-17	+24	-20	+11	+77	-26	+31	-53
16	239	193	-------	+50	+3	-45	-30	+5	+21	+45	+49	-10	+31	-49
17	223	177	-------	-2	-1	-57	-33	+14	+19	+10	+26	-15	+55	-51
18	207	167	-------	-4	-13	-50	-7	+13	+14	+4	+22	-24	+87	-40
19	191	152	-------	-5	-8	-50	-12	+1	+4	-10	+18	-16	+95	-36
20	175	137	-------	-32	+15	-32	-1	0	+10	+2	+17	-18	+92	-21
21	159	124	-------	-15	+7	-27	-6	+1	0	+17	+11	-7	+80	+3
22	143	113	-------	-18	+3	-31	-18	+4	+10	+32	-2	-8	+61	+3
23	127	100	-------	-14	-3	-26	-11	+12	+10	+11	+6	+2	+48	-1
24	112	91	-------	-29	-3	-29	-18	-8	+23	-5	+6	+3	+36	+3
25	101	82	-------	-36	-19	-17	-24	-7	+17	-7	-3	+3	+15	+8
26	94	72	-------	-14	-9	-22	-9	+11	+13	-8	+8	+6	+14	-5
27	89	66	-------	-11	-15	-20	-12	+4	0	-2	+6	-3	+12	-1
28	84	61	-------	+2	-10	-15	-3	-3	+2	-5	+8	+3	+4	-3
29	82	57	-------	-11	-7	-17	-7	-2	+3	-5	+4	+5	+6	+1
30	80	55	-------	-5	-4	-13	-7	+4	+5	+7	-4	-3	-3	-3
31	78	54	-------	+2	+2	-5	-7	+2	+5	+7	+6	-3	+6	+2
32	78	54	-------	-4	-2	-5	-3	+5	-4	+13	0	+7	+13	0
33	77	56	-------	-8	-6	-1	-3	+1	-3	0	+3	-7	+9	+2
34	76	57	-------	-7	-7	-12	-1	-1	-10	-3	-3	-4	+8	+2
35	76	58	-------	-3	-16	+2	-6	-1	+3	+19	-1	+4	+3	-3
36	77	59	-------	-10	-7	-2	-7	+5	+6	+10	-4	+5	+1	+5
37	79	61	-9	-2	0	-7	-3	-6	-1	+9	-8	+3	+6	-6
38	82	64	+63	-3	-4	-5	-11	+10	-5	-11	+8	+2	+7	-9
39	88	67	+314	-5	-2	-8	-8	+1	+9	-2	+9	-3	+6	-1
40	96	74	+1,145	-5	-12	-12	-4	-1	+10	+1	-6	-2	+20	+8
41	103	83	+2,659	+5	-10	-15	-1	-6	+18	+20	+3	-4	+7	+3
42	113	90	+4,799	-12	-12	-10	-6	+4	+9	+15	+6	-1	+33	+15
43	123	101	+4,792	-25	-18	-9	-1	-6	-10	+25	+9	0	-3	+15
44	134	110	+3,376	-20	-24	-10	-2	-7	-14	+38	+4	-10	-9	+11
45	145	117	+1,719	-24	-21	-21	+15	+8	+11	+34	+4	-4	-10	+1
46	160	126	+901	-31	-19	-8	+1	+1	+10	+30	+8	-2	-5	-20
47	178	134	+568	-33	-7	-29	+5	+4	-2	0	-42	-28	+6	-30
48	198	140	+464	-21	-1	-25	+9	-9	+4	+16	+5	-9	+26	-23
49	218	145	+554	-7	-11	-24	+13	-6	+28	-3	+9	-19	+63	+9
50	236	156	+737	-1	-4	-25	+24	-3	+30	0	-3	-21	+121	+11
51	251	170	+770	-1	-23	-28	+23	-14	+28	-21	-8	-16	+187	+1
52	262	185	+638	-16	+1	-31	+23	-33	-12	+13	+2	-1	+254	-23
53	---------	190	-------	+5	------	------	------	------	+39	------	------	------	------	------

[1] From July 1, 1919, to Jan. 1, 1930, the excesses are computed as deviations from the median death rate for the corresponding week for the period 1921-1927. The series of 52 medians representing "normal" or "expected" rates for the different weeks of the year were smoothed by a 5-period moving average before deviations were computed. The smoothed medians are the values in the third column of the table. For the period prior to July 1, 1919, the excesses are computed as deviations from an estimated median death rate for the corresponding week for the period 1910-1916. As weekly data were not available for this period, monthly rates (annual basis) and medians were computed. The median rates were plotted, and a smooth line passing through each of the 12 monthly medians was drawn to represent the seasonal curve of mortality from influenza and pneumonia. From this graph the approximate medians for each week of the year were read. The medians so derived are the values in the second column of the table.

[2] Aggregate enumerated population in 1920 census, 20,440,548; aggregate estimated 1928 population, 23,421,000. For list of cities, see footnote to Table 3.

TABLE 6.—*Excess*[1] *monthly death rates (annual basis) per 100,000 from influenza and pneumonia in a group of 35 cities*[2] *in the United States, 1910–1919*

Month	Median 1910–1916	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
January	273	+31	+33	−4	0	−14	−43	+153	+108	+27	+575
February	279	+18	+5	−8	+30	0	−25	−16	+63	+22	+282
March	297	+13	+6	−30	−3	+15	0	−44	−3	+86	+175
April	249	+6	+21	−34	−36	0	+38	−42	−11	+119	+13
May	180	+21	+7	−8	+5	0	−30	−13	−78	−10	−31
June	111	+24	−12	0	+21	−6	+5	−7	+3	−26	−37
July	83	+13	+4	0	+1	−9	−6	−3	−11	−13	−28
August	77	+3	0	0	−1	−9	−10	0	−11	−24	−26
September	79	+18	+8	0	+5	−3	−3	−1	+4	+188	−18
October	109	+14	+10	+22	0	−13	−2	0	+16	+3,482	−32
November	157	+42	+14	+3	0	−9	−4	0	+18	+817	−53
December	241	+50	−24	+9	−44	−41	+116	0	−12	+604	−79

[1] Excess over the median 1910–1916.
[2] Aggregate enumerated population in 1920 census, 20,440,548; aggregate estimated 1928 population, 23,421,000. For list of cities, see footnote to Table 3.

The deviations summarized in these two tables are shown graphically in Figure 1. The upper section, corresponding to the data in Table 6, shows deviations by months, from January, 1910, to August, 1918, while the bottom section, corresponding to the data in Table 5, shows deviations by weeks beginning in September, 1918.

With respect to Figure 1 it should be noted that the graphic representation of excess mortalities by months, in the upper section, is not altogether comparable with that by weeks, as given in the lower section. The death rates in both sections are on an annual basis, hence are comparable in that respect; but since a monthly rate is the mean for a period of more than four weeks, it can not equal the maximum rate for a single week, except in the rare case where this exact rate is sustained for *every* week in the period. It follows that in any given period of excess mortality the peak is higher if the rates are given by weeks than if they are stated by months, the extent of the difference depending upon the explosiveness of the epidemic and upon whether it falls largely within a single month or is more evenly divided between two. However, the discrepancies between weekly and monthly rates, which may be very great in a single compact population unit, are not so great when the population is made up of a group of cities widely dispersed over such a large area as that of the United States.

Referring to the upper section of Figure 1, and to Table 6, which corresponds, it is seen that throughout the year 1910, and for the first few months of 1911, mortality is generally above the "norm," but without notable concentration of the excess in any single month or any two or three successive months. From June, 1911, to December, 1915, death rates are generally below the norm, negative deviations being more frequent and usually larger than the positive ones. However, in April, 1915, there is an excess mortality which, though small in an absolute sense, deserves to be noted, because it comes within a period of low death rates and makes a peak which, measured

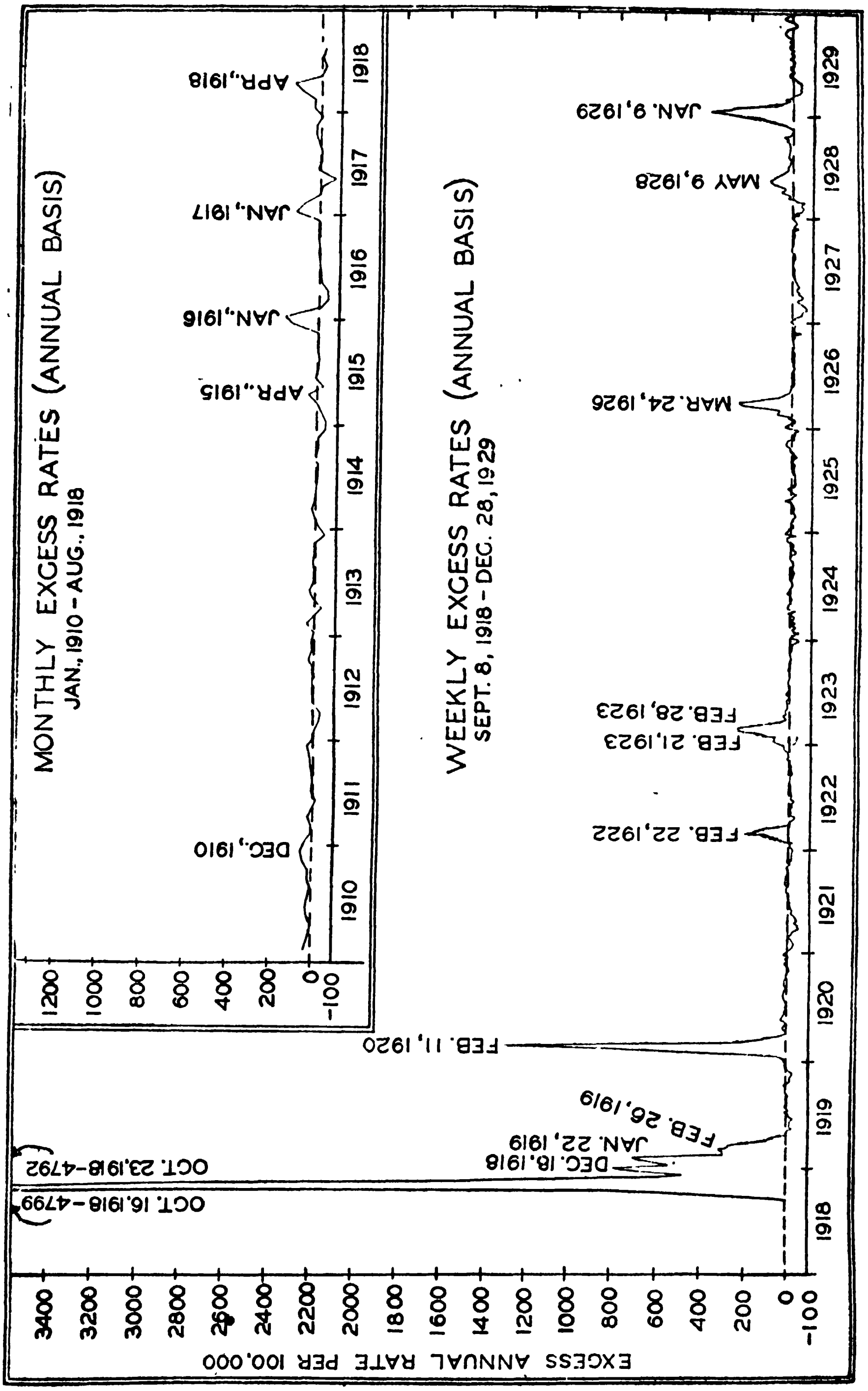

FIGURE 1.—Excess influenza-pneumonia mortality in a group of 35 large cities in the United States, 1910–1929. Dates on graph are middle (Wednesday) of the peak weeks. (Prior to July 1, 1919, excess rates are deviations from the median rates 1910–1916; after that date they are deviations from the median rates 1921–1927. For details of computations see footnotes to Tables 5 and 6. For list of cities see footnote to Table 3)

from the then current prevailing level, is by no means insignificant. Much larger increases in mortality above the mean level are shown in December, 1915, January, 1916, and January, 1917, and in March and April, 1918. The peak of mortality in the winter of 1915–16 corresponds to an epidemic of acute respiratory disease which was noted at the time in medical literature as "influenza" and was officially reported as such from at least 20 States. Also at that time, December, 1915, and January, 1916, the number of deaths recorded under the diagnosis of "influenza" notably increased. In January, 1917, when mortality from respiratory diseases again sharply increased, no epidemic of so-called influenza seems to have been widely noted in medical journals or in official morbidity reports. Likewise for the next period of high mortality, March and April, 1918, there are no morbidity records indicating any generalized epidemic recognized at the time as "influenza." It has, however, been noted by Frost, Jordan, and Vaughan and others,[5] that about this time epidemics of "influenza" were reported from a number of military cantonments, especially in Southern States; a rather severe outbreak was reported from San Quentin prison in California; and there were reports from various other places of epidemics which, at the time, seem to have been considered local.

Turning to the graphic record by weeks, from September, 1918, through 1929, the enormous excess mortality shown in the great epidemic of 1918–19, extending over 31 weeks (September 15, 1918, to April, 19, 1919), overshadows all prior and subsequent occurrences. Following this, periods of increased mortality sufficiently sharp and definite to justify designation as "epidemics" are seen culminating in the weeks whose midpoint (Wednesday) was February 11, 1920, February 22, 1922, February 21–28, 1923, March 24, 1926, and January 9, 1929. A smaller but quite definite epidemic is shown extending from about the eleventh to the twenty-ninth week of 1928, with its peak in the week having its midpoint (Wednesday) on May 9.

Omitting the slight increase in mortality observed in April, 1915, Figure 1 and Tables 5 and 6 show 10 distinct periods, each of 8 to 31 weeks' duration, in which the mortality from influenza and pneumonia in this group of widely dispersed cities was so greatly increased as to denote an "epidemic" condition. The relative effect of these several epidemics upon the death rate may be judged moderately well by inspection of Figure 1, in which the excess mortality is indicated by the area under the curve of each epidemic; but a better basis for comparison is a numerical statement of the total excess

[5] Frost, W. H.: The epidemiology of influenza. Public Health Rep., vol. 34, No. 33, August 15, 1919 (Reprint 550). (Other references are cited on p. 9 of this reprint.)

Jordan, E. O.: Epidemic influenza. Am. Med. Assoc.; Chicago, 1927, p. 69.

Vaughan, V. C., Vaughan, H. F., and Palmer, G. T.: Epidemiology and public health. Vol. I, Respiratory Infections. C. V. Mosby Co., St. Louis, 1922, pp. 314–318.

mortality for the entire period of each epidemic. To estimate this excess, it is necessary, in each instance, to assign definite dates for the beginning and ending of the epidemic. No serious question arises as regards the periods to be included in the epidemics of 1918–19, 1920, and 1922, and for 1928–29. In each of these periods the death rate from influenza and pneumonia rises abruptly above the norm, increases progressively week by week until a peak is reached, then declines progressively and regularly to a level which is again below the norm. Each of these epidemics is, therefore, easily defined as beginning in the first week when the mortality begins to exceed the norm, and as terminating in the last week which shows a positive deviation. The epidemics of 1923, 1926, and the spring of 1928 are not so sharply defined at either end, so that any time limits assigned to them are debatable. Actually, however, it makes no great difference in the computed total of mortality whether one includes or excludes at either end one or two weeks when the death rate was only slightly above the normal.

To compute the excess mortality recorded as influenza and pneumonia to be charged against each epidemic, the excess death rates in the several weeks of the period have been added; then, as these rates are on an annual basis, this sum has been divided by the number of weeks in the calendar year. The result is a statement of the excess mortality rate per 100,000 persons for the period of the epidemic. Hence, the figures for the different epidemics are made directly comparable, regardless of differences in duration of the various epidemics. The reliability of the estimates depends, of course, upon the accuracy of the norms from which excess mortality is reckoned.

For epidemics in the period 1910 to July, 1918, when monthly records were used, the procedure followed was comparable, but obviously the durations of epidemics are indicated only in a very rough way by monthly data.

Table 7 shows for each of 10 epidemic periods from December, 1915, to February, 1929, the estimated total excess mortality recorded as influenza or pneumonia; the highest excess rate observed in any single week; the approximate date of the peak of the epidemic, and its duration. As regards durations of these epidemics, varying from 2 months to 31 weeks, it is to be remembered that these periods apply to the epidemics as spread over a large area, and are longer than the durations of the same outbreaks in individual cities.

TABLE 7.—*Summary of excess [1] mortality from influenza and pneumonia during epidemics in a group of 35 large cities [2] in the United States, 1915–1929*

Epidemic	Total excess rate per 100,000 during whole epidemic	Maximum weekly excess rate per 100,000		Estimated peak day [3]	Total period considered as above normal	
		Actual or weekly basis	Annual basis		Total time	Dates (in calendar weeks) of first and last week
Winter, 1915–16	22.8			January, 1916	2 months	December and January.
1917	14.0			January, 1917	do	January and February.
Spring, 1918	21.1			April, 1918	4 months	January to April, inclusive.
Winter, 1918–19	550.5	92.0	4,799	Oct. 19, 1918	31 weeks	38 to 16, inclusive.
1920	97.2	24.3	1,267	Feb. 9, 1920	12 weeks	1 to 12, inclusive.
1922	20.7	4.0	210	Feb. 23, 1922	14 weeks	2 to 15, inclusive.
1923	32.3	4.5	237	Feb. 25, 1923	20 weeks	48 to 15, inclusive.
1926	28.2	4.9	255	Mar. 22, 1926	17 weeks	5 to 21, inclusive.
Spring, 1928	14.5	1.8	95	May 11, 1928	19 weeks	11 to 29, inclusive.
Winter, 1928–29	40.8	7.1	371	Jan. 8, 1929	12 weeks	48 to 7, inclusive.

[1] Computed from Tables 5 and 6.

Prior to July 1, 1919, excesses are those over median rates for corresponding times of the year during the period 1910–1916; after that date excesses are those over similar median rates during the period 1921–1927.

Because the rates in nonepidemic weeks of 1922 are nearly all lower than the median rate 1921–1927, a correction was made for that epidemic by measuring the excess not over the zero base line representing the median rate (fig. 1) but over a line parallel to the base line but 25 points (in the rate per 100,000) below it.

[2] For list of cities, see footnote to Table 3.

[3] The modal or peak day was estimated by interpolation within the modal or peak week (determined by inspection) of the excess death rates by the method of differences, the following formula being used:

$$\text{Mode} = L + \left[-\frac{\Delta f_{-1}}{\Delta^2 f_{-1}}\right] \text{in which}$$

L = lower limit of modal class (first day of peak week).
f_0 = frequency (excess rate) in modal or peak week.
f_{-1} = frequency (excess rate) in week prior to modal or peak week.
f_{+1} = frequency (excess rate) in week following modal or peak week.

First and second differences (Δ and Δ^2, respectively) for use in the formula are computed as follows:

$$\Delta f_{-1} = f_0 - f_{-1}$$
$$\Delta^2 f_{-1} = (f_{+1} - f_0) - (f_0 - f_{-1})$$

The expression in the formula which is added to the lower limit of the modal class always comes out in the form of a fraction or decimal less than unity and is in usual frequency distributions multiplied by the class interval and added to the lower limit of the class. This was adapted to the weekly intervals by reducing this decimal to sevenths; if it was less than one-seventh, the estimated modal day was the first day of the week; if it was between one-seventh and two-sevenths, the modal day was the second day of the week, etc.

RECORDS OF MORTALITY FROM INFLUENZA AND PNEUMONIA IN INDIVIDUAL CITIES

Since the 35 cities which make up the group that has been considered, include representatives from all parts of the United States, the course of mortality in this group as a whole serves to indicate quite clearly the epidemics which have been relatively widespread. It does not necessarily reveal equally severe epidemics which may have been localized; and as to those which are widespread, it gives no clear information as to details of spatial and time distribution. Hence, it has been thought necessary to add a record of the mortality from influenza and pneumonia in each one of the 35 cities which compose the group that has been considered, and in the 15 other cities that had

100,000 or more population in 1910 and for which comparable data are available.[6]

Table A of the appendix shows, for each of these cities, for each month from 1910 to 1929, the deviation of the observed mortality from a norm which is taken as representing the "average" death rate for that time and place. The seasonal norms used for each city are derived in the manner already described. That is, for the period 1910 to July 1, 1919, the norm used is, for each month, the median of the death rates for this month for the years 1910–1916; and from July 1, 1919, through 1929, the norm is similarly derived from the death rates in the years 1921–1927.

Supplementing this table, which covers 20 years, are appendix Tables B and C which show for each city the excess death rates from influenza and pneumonia by weeks during the epidemics of 1918–19, 1920, and 1928–29.

The monthly deviations given in Table A of the appendix are shown graphically in Figures 2 to 11, inclusive, in which the 50 cities considered are arranged in geographic groups, the order of sequence being generally from north to south and from east to west.

The data included in Table A and these graphs are principally material for reference, with no intention of undertaking at this time any detailed discussion of local variations in the mortality from influenza and pneumonia, but a few prominent facts may be noted in connection with the graphs.

We are more or less accustomed to think of the 1918–19 pandemic as having occurred principally in October and November, 1918, and as having been rather uniform in its severity throughout the United States. It is seen, however, that the epidemic actually continued in most localities well into or beyond March, 1919, and that as regards

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[6] The populations used in computing rates were the estimates made by the Bureau of the Census except in a few instances where no estimate was made by the census. Table D of the appendix shows the enumerated populations of 1910 and 1920 and the 1928 estimated populations.

As this article goes to press, provisional results of the census of 1930 are being announced. A preliminary check of the estimates indicates that for certain cities there is considerable error in the populations used. In 9 of the 50 cities the estimates of 1928 seem to be more than 10 per cent in error even after annexations since 1928 are taken into account. (Prior to 1928, annexations are taken into account in the estimates that were made by the Census Bureau.) The estimated populations of 1928 for Cambridge, Cleveland, Providence, New Haven, Lowell, Fall River, and Washington were 11 to 16 per cent too high; for Bridgeport from 20 to 25 per cent too high, and for Los Angeles about the same percentage too low. In 29 of the other cities the errors in population estimates for 1928 were 5 per cent or less, and in 12 cities were from 6 to 10 per cent.

For years prior to 1928 the extent of the errors in the population estimates would decrease as the year under consideration approached the 1920 census and even the large errors would be negligible in epidemics prior to that of 1926. The chronological changes in the rates would be approximately correct, inasmuch as the error in population increases only gradually from year to year. With excess weekly rates per 100,000 (annual basis) in the 1928–29 epidemic running as high as 3,000 and excess monthly rates (annual basis) of nearly half that amount, and with a range in excess rates of from 100 to considerably more than 500 per cent of the normal or median rates, a correction of 10 or even 20 per cent would not greatly change the picture.

The population estimate used for the group of 35 cities as a whole was approximately correct, the error indicated by provisional returns for 1930 being less than 3 per cent.

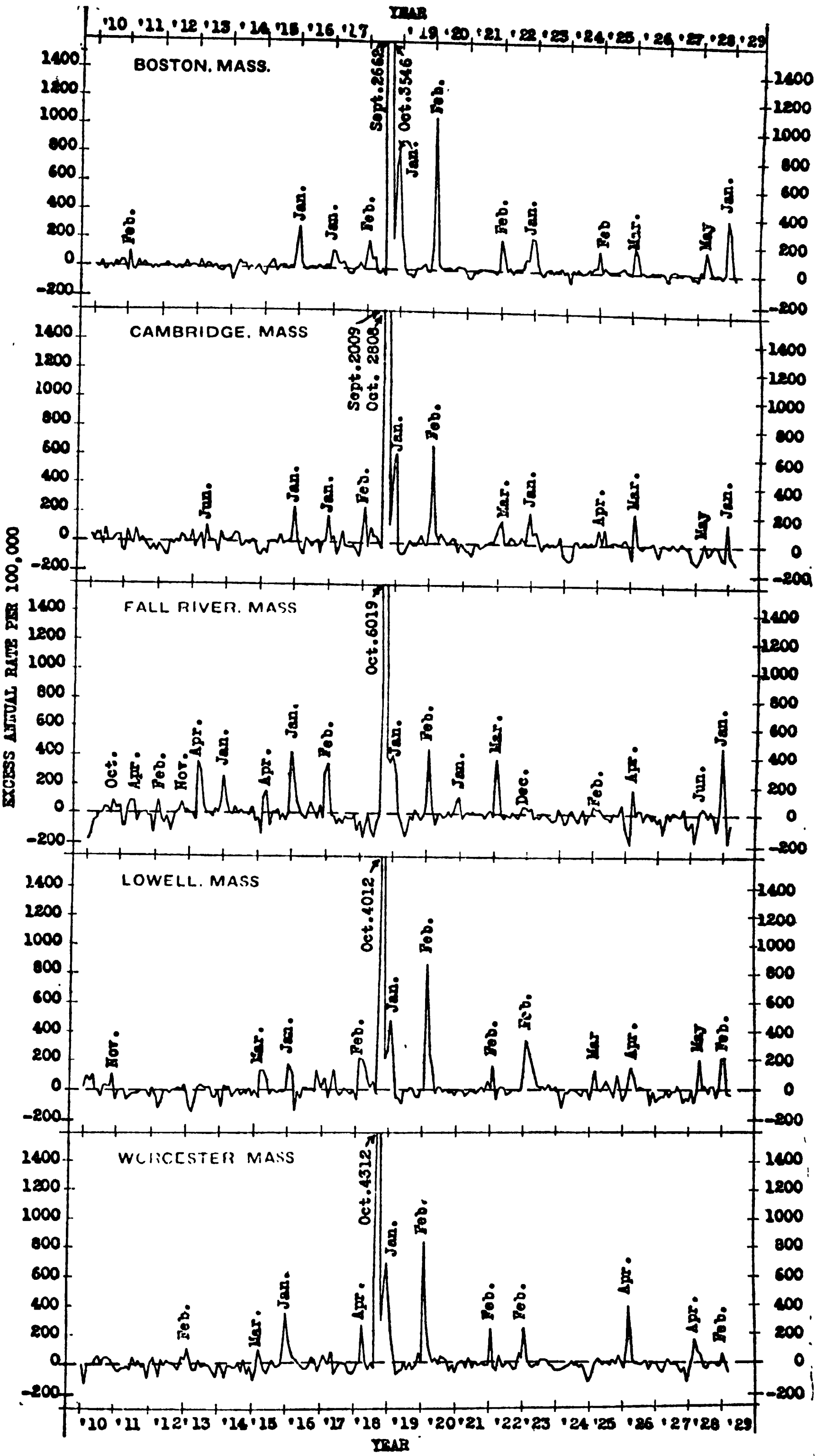

Figure 2.—Monthly excess influenza-pneumonia mortality rates (annual basis) in certain large cities of the United States, 1910–1929. (Prior to July 1, 1919, excess rates are deviations from the median rate for the corresponding month for the period 1910–1916; after that date they are deviations from the median rate for the corresponding month for the period 1921–1927)

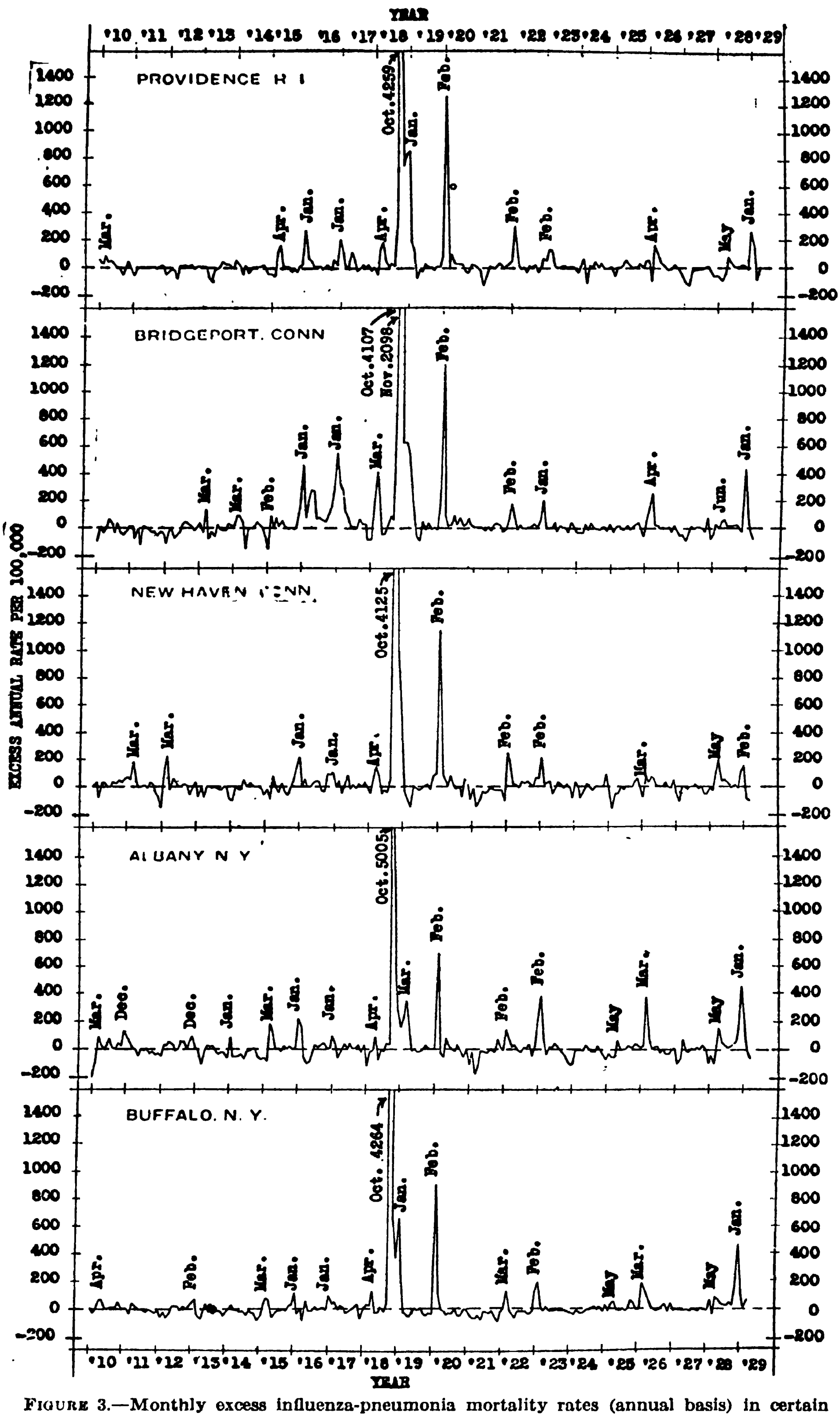

FIGURE 3.—Monthly excess influenza-pneumonia mortality rates (annual basis) in certain large cities in the United States, 1910–1929. (Prior to July 1, 1919, excess rates are deviations from the median rate for the corresponding month for the period 1910–1916; after that date they are deviations from the median rate for the corresponding month for the period 1921–1927)

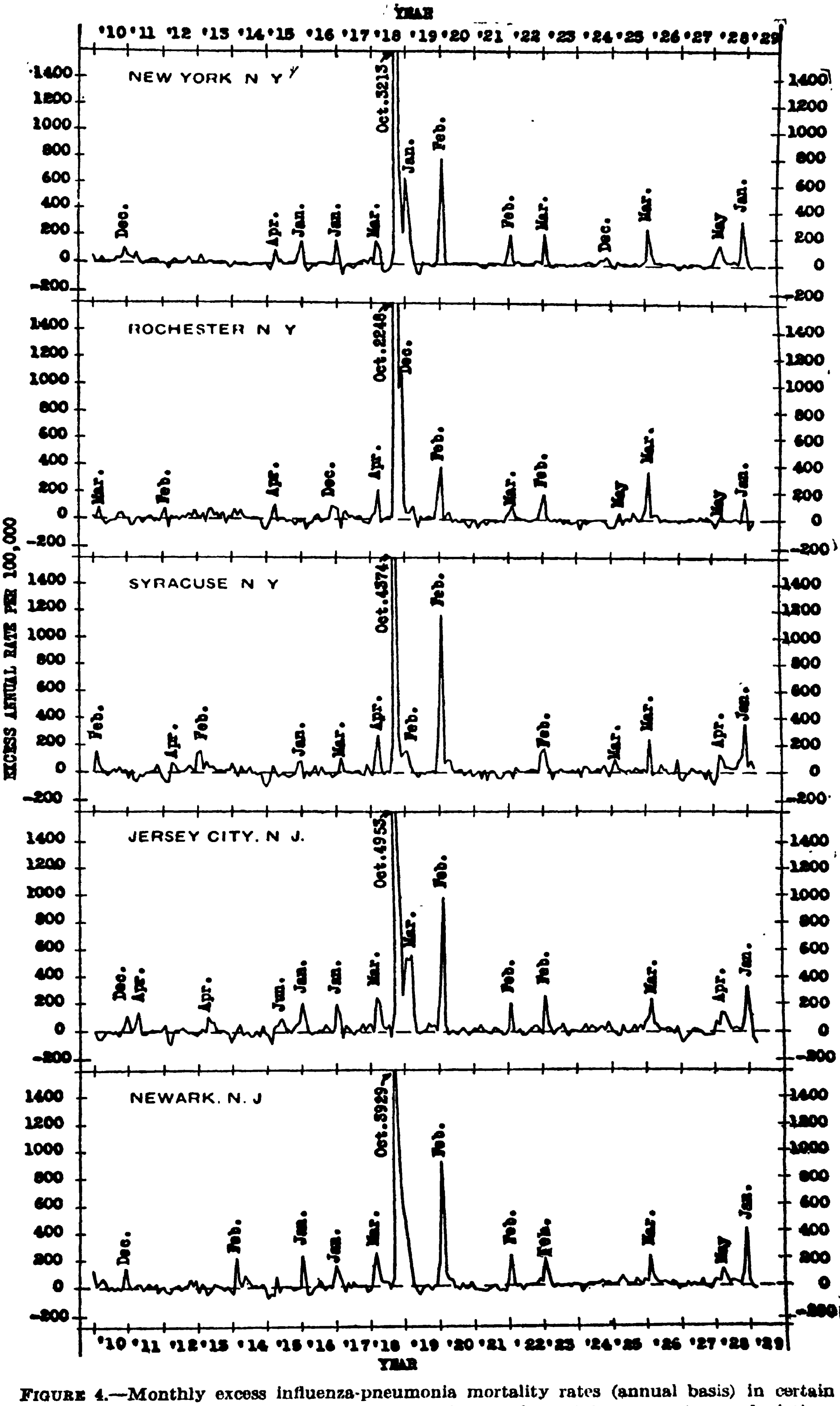

FIGURE 4.—Monthly excess influenza-pneumonia mortality rates (annual basis) in certain large cities of the United States, 1910–1929. (Prior to July 1, 1919, excess rates are deviations from the median rate for the corresponding month for the period 1910–1916, after that date they are deviations from the median rate for the corresponding month for the period 1921–1927)

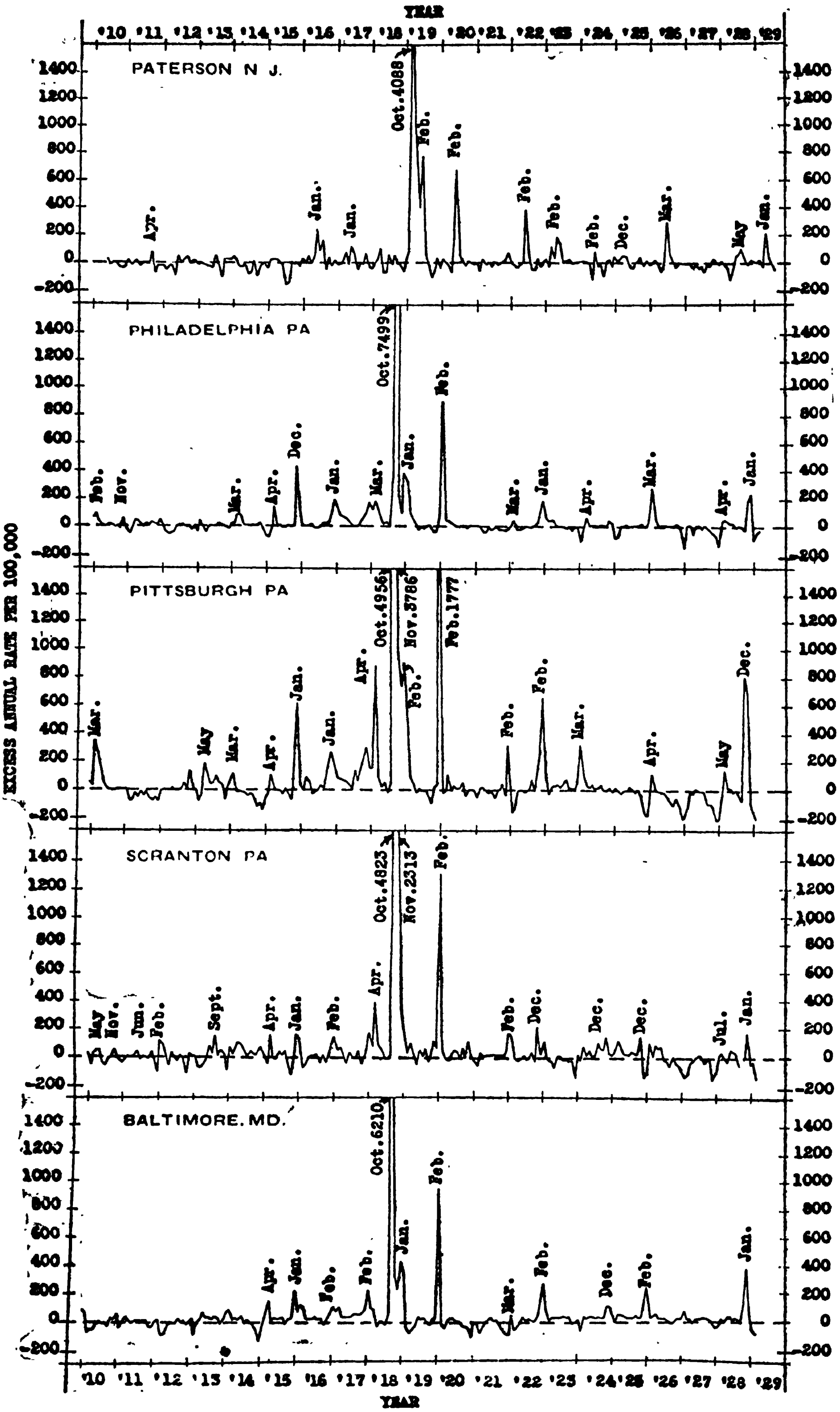

Figure 5.—Monthly excess influenza-pneumonia mortality rates (annual basis) in certain large cities of the United States, 1910–1929. (Prior to July 1, 1919, excess rates are deviations from the median rate for the corresponding month for the period 1910–1916; after that date they are deviations from the median rate for the corresponding month for the period 1921–1927)

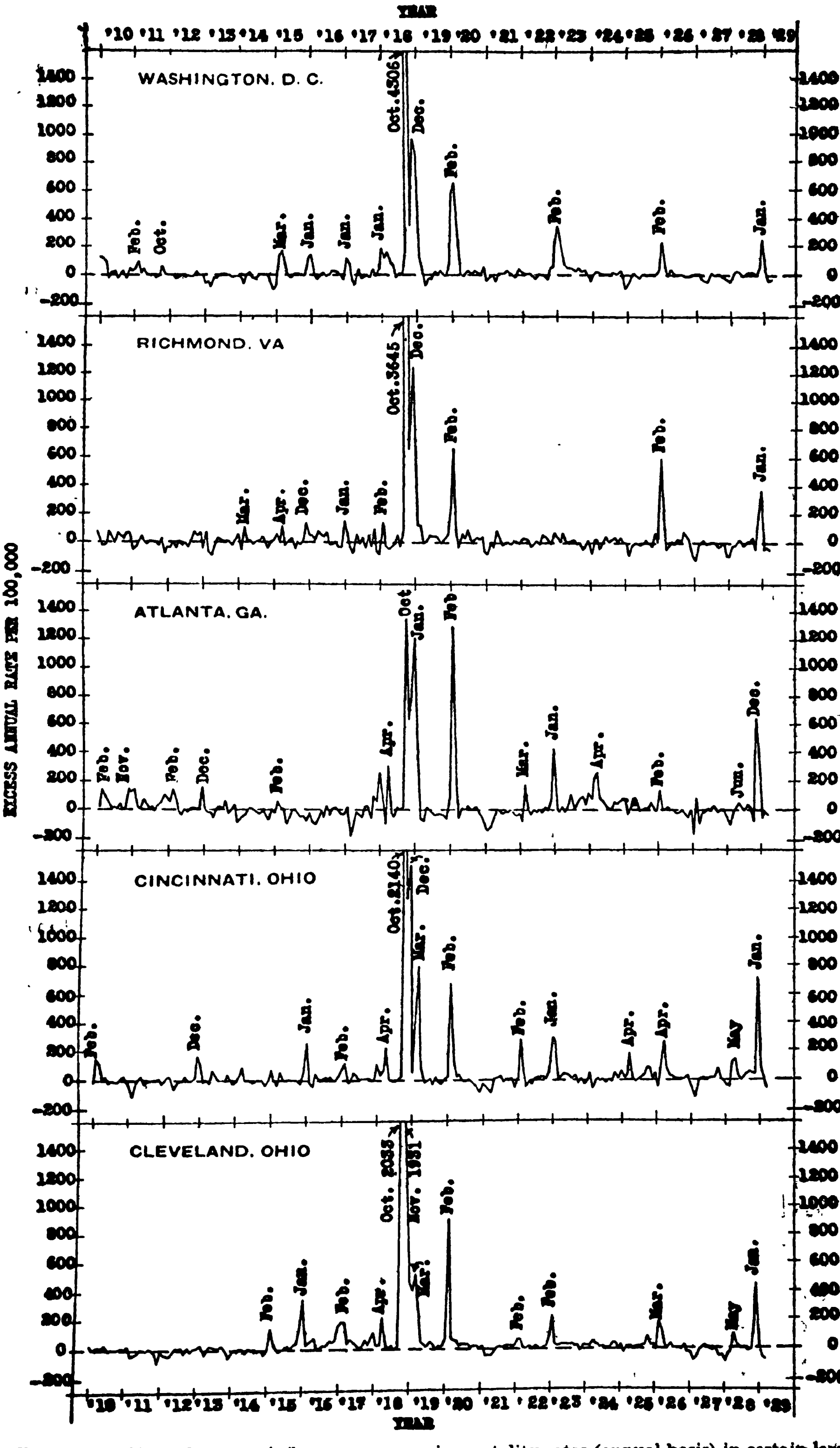

FIGURE 6.—Monthly excess influenza-pneumonia mortality rates (annual basis) in certain large cities in the United States, 1910–1929. (Prior to July 1, 1919, excess rates are deviations from the median rate for the corresponding month for the period 1910–1916; after that date they are deviations from the median rate for the corresponding month for the period 1921–1927)

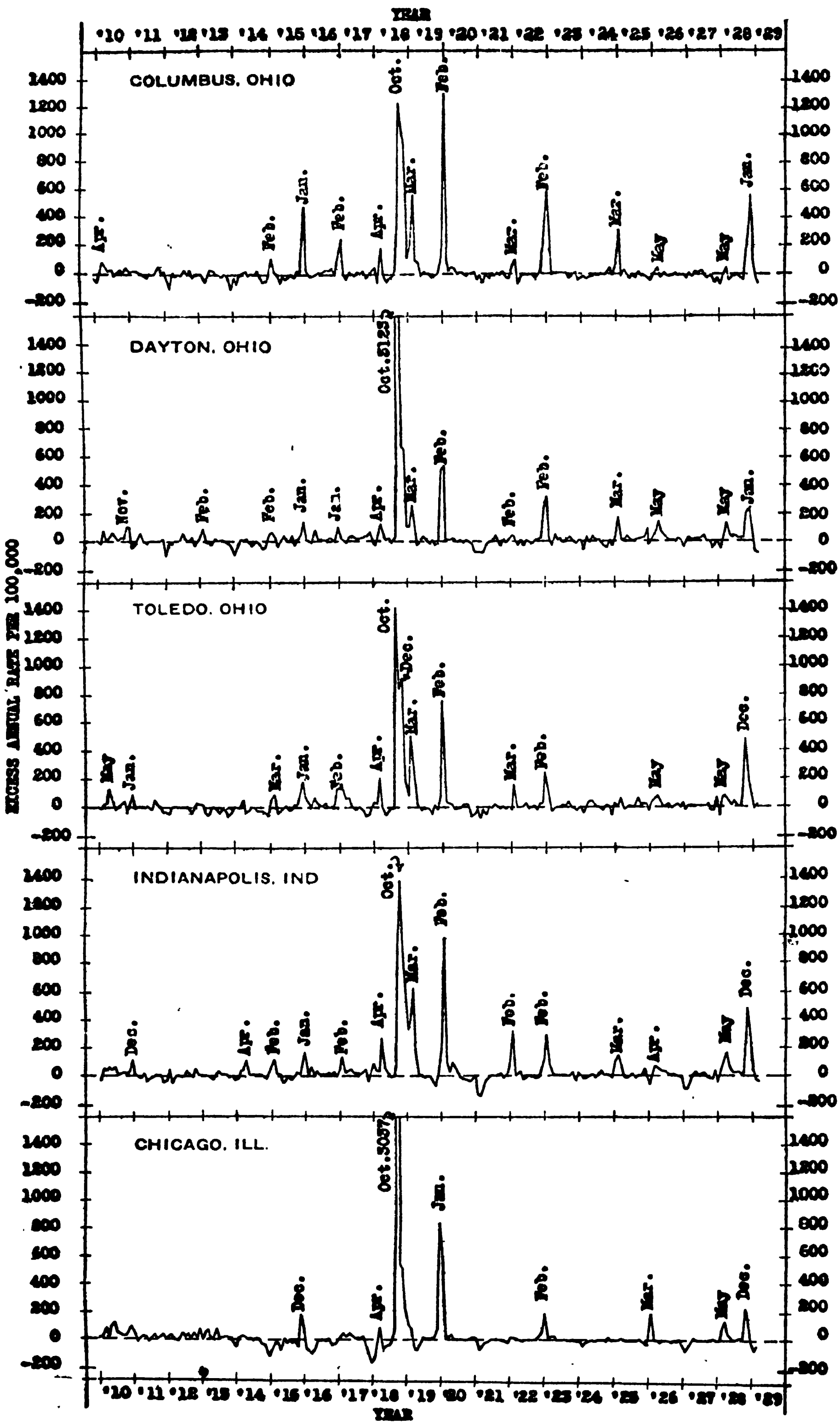

FIGURE 7.—Monthly excess influenza-pneumonia mortality rates (annual basis) in certain large cities in the United States, 1910–1929. (Prior to July 1, 1919, excess rates are deviations from the median rate for the corresponding month for the period 1910–1916; after that date they are deviations from the median rate for the corresponding month for the period 1921–1927)

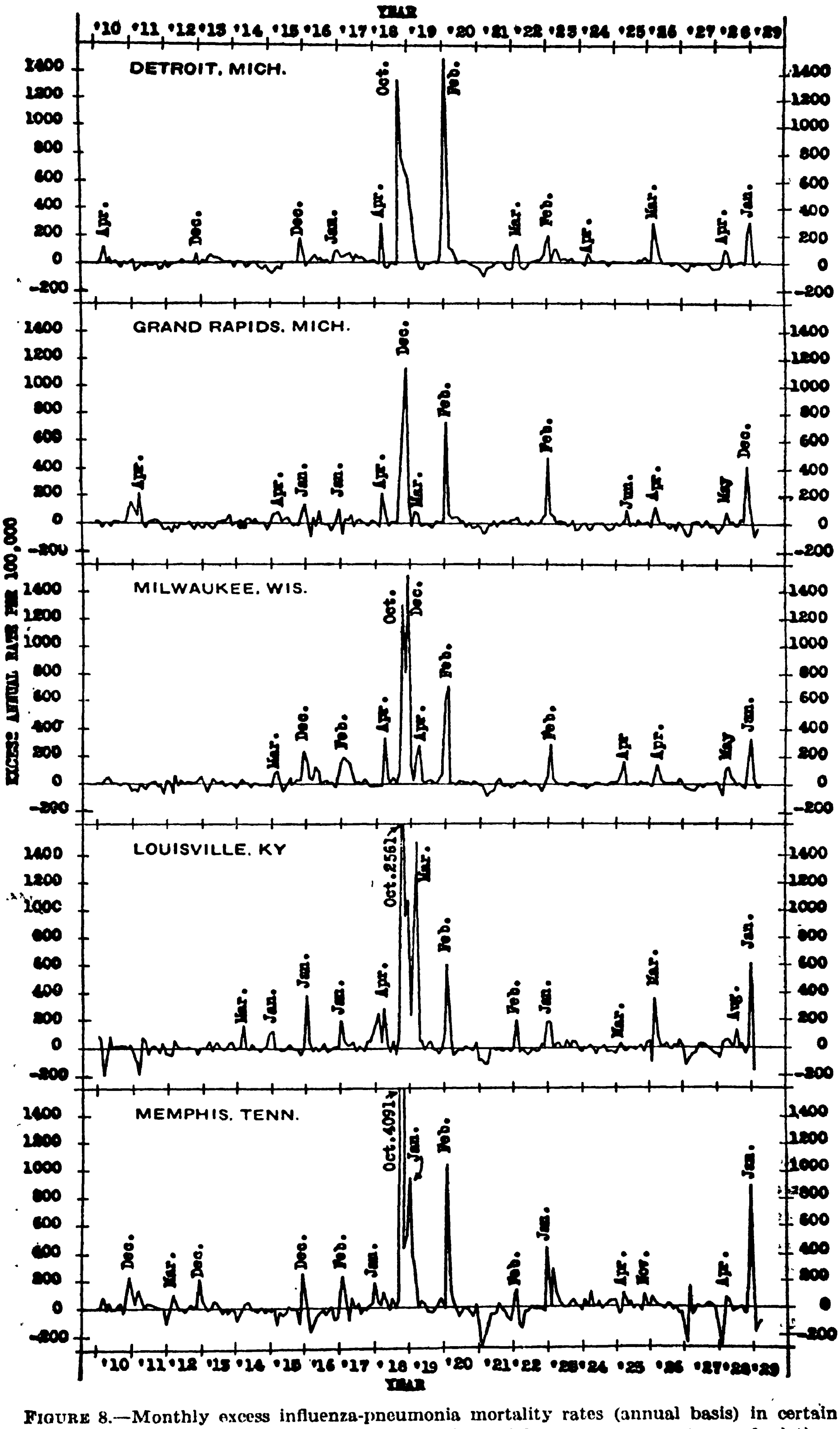

FIGURE 8.—Monthly excess influenza-pneumonia mortality rates (annual basis) in certain large cities of the United States, 1910–1929. (Prior to July 1, 1919, excess rates are deviations from the median rate for the corresponding month for the period 1910–1916; after that date they are deviations from the median rate for the corresponding month for the period 1921–1927)

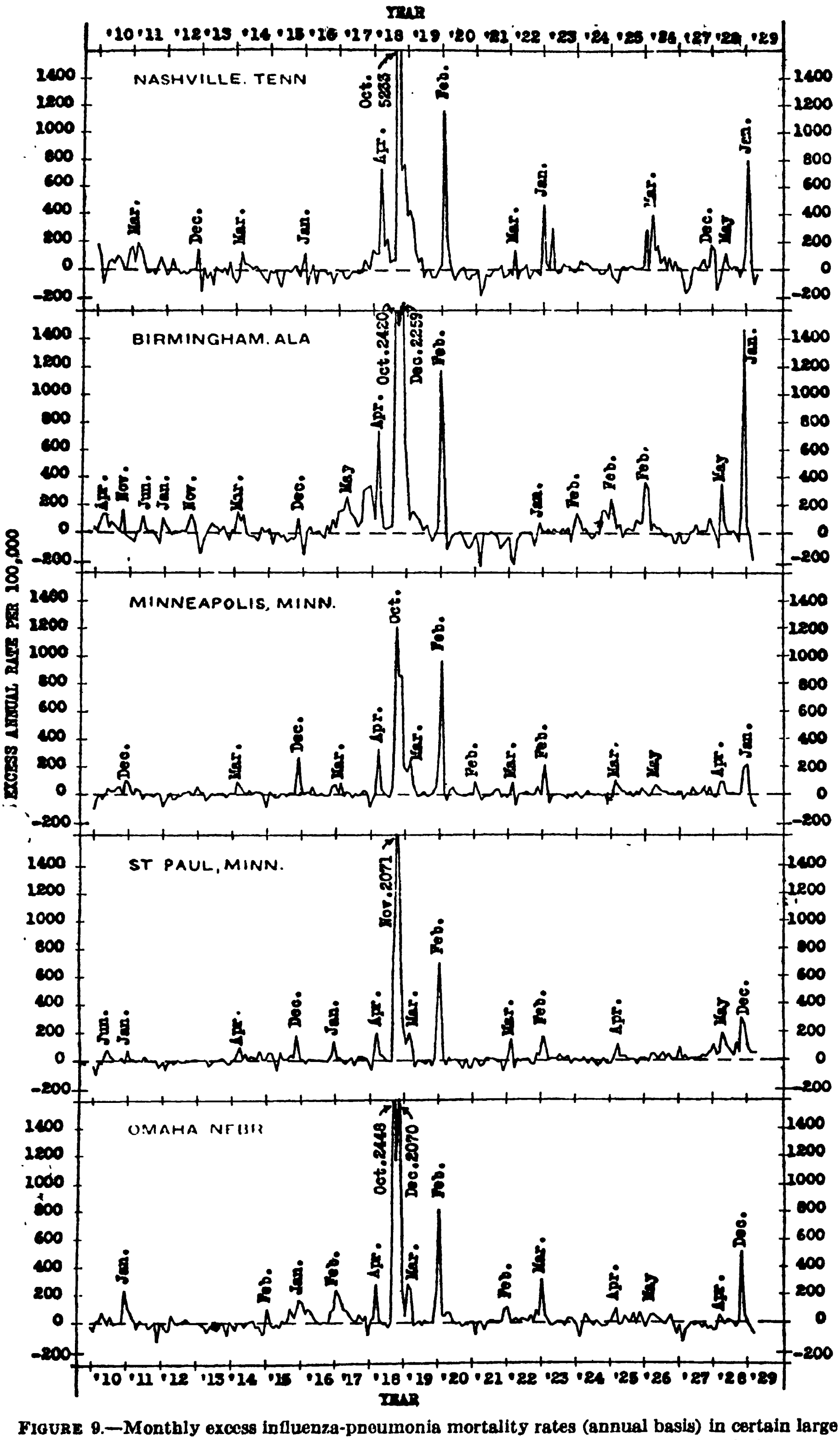

Figure 9.—Monthly excess influenza-pneumonia mortality rates (annual basis) in certain large cities of the United States, 1910–1929. (Prior to July 1, 1919, excess rates are deviations from the median rate for the corresponding month for the period 1910–1916; after that date they are deviations from the median rate for the corresponding month for the period 1921–1927)

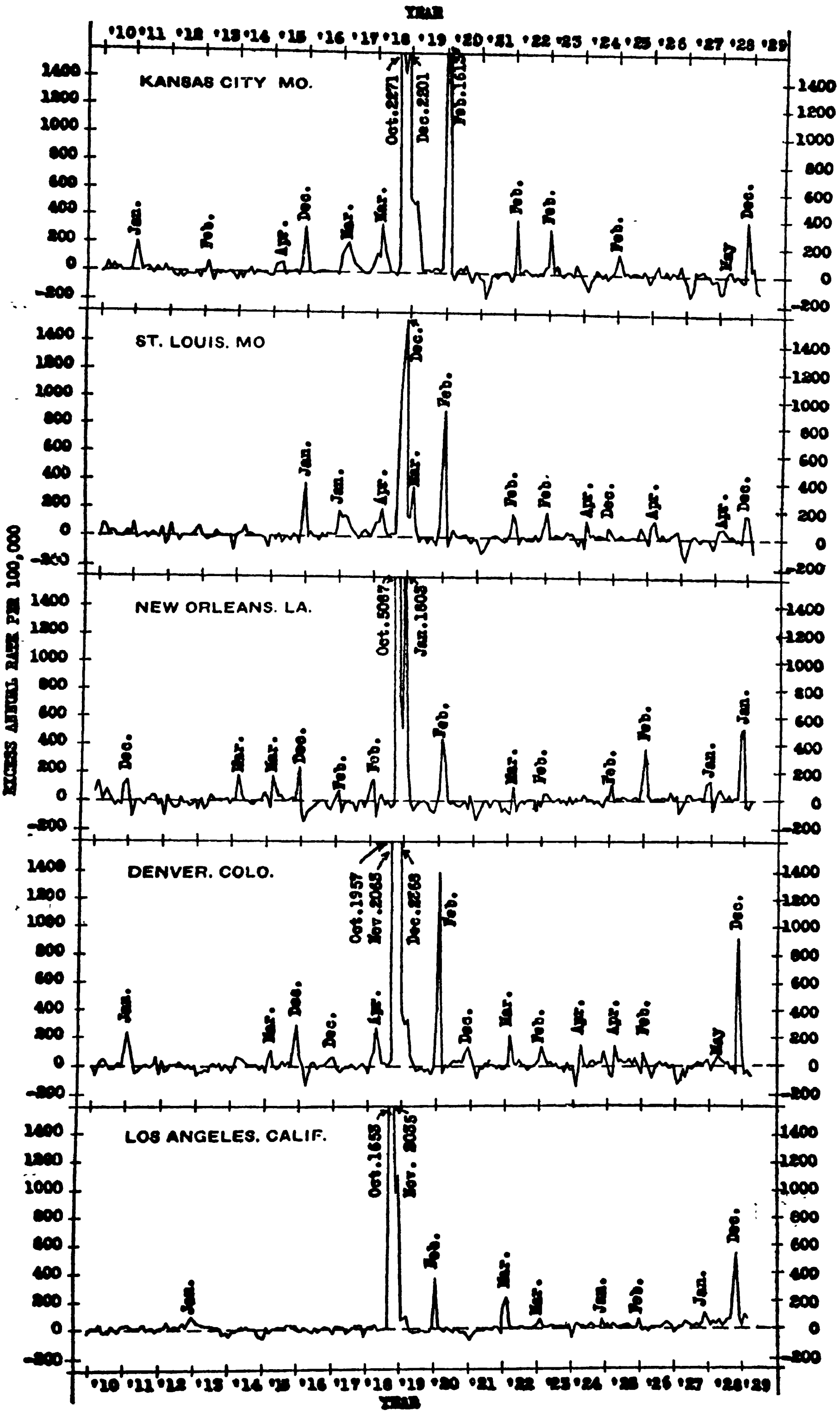

FIGURE 10.—Monthly excess influenza-pneumonia mortality rates (annual basis) in certain large cities of the United States, 1910–1929. (Prior to July 1, 1919, excess rates are deviations from the median rate for the corresponding month for the period 1910–1916; after that date they are deviations from the median rate for the corresponding month for the period 1921–1927)

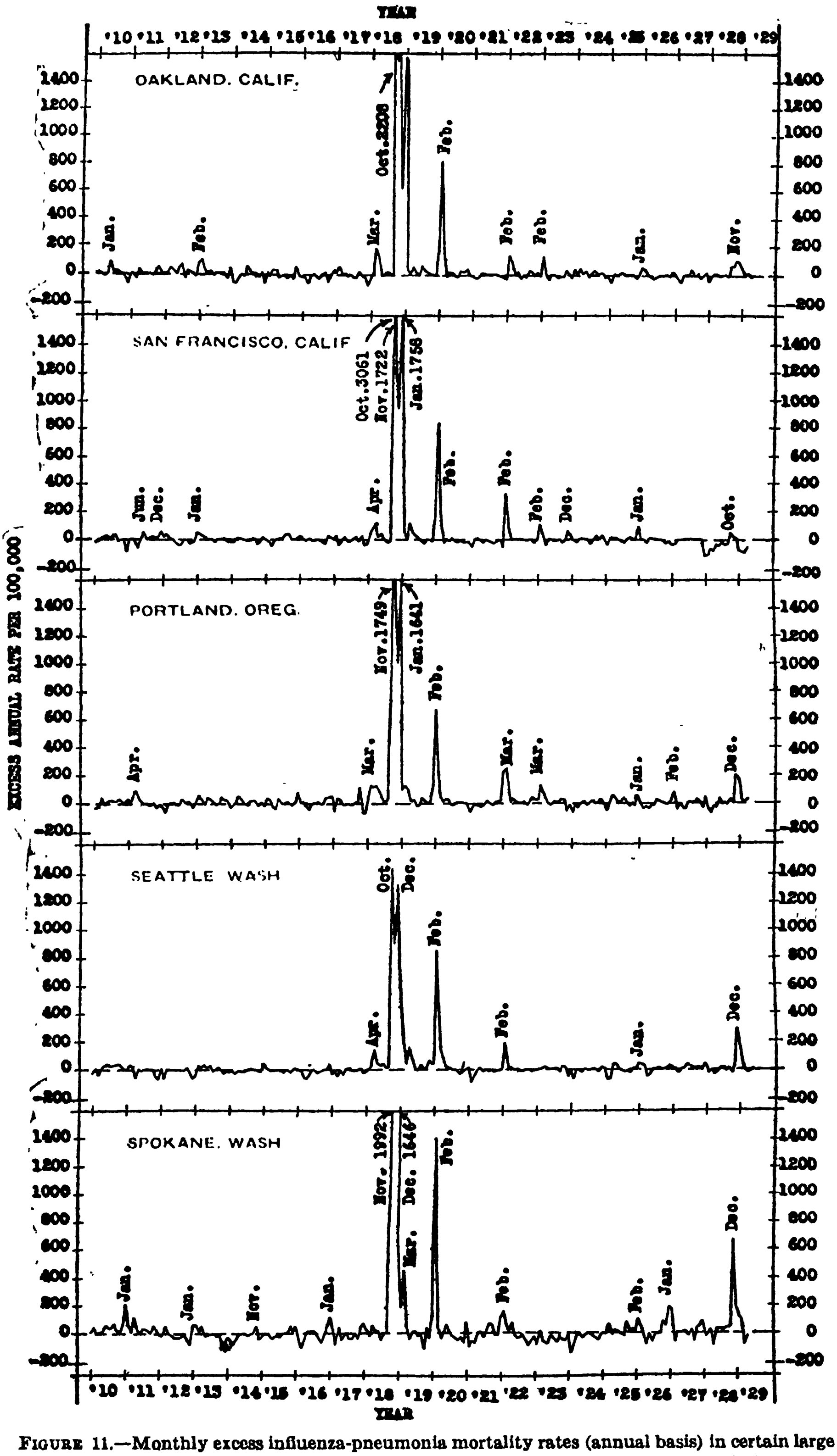

FIGURE 11.—Monthly excess influenza-pneumonia mortality rates (annual basis) in certain large cities of the United States, 1910–1929. (Prior to July 1, 1919, excess rates are deviations from the median rate for the corresponding month for the period 1910–1916; after that date they are deviations from the median rate for the corresponding month for the period 1921–1927)

the time and height of the mortality peak, it varied widely in different cities and also in the relative height of successive peaks in those cities where two or more are well marked.

In every city the epidemic of 1920 contrasts sharply with that of 1918–19 in its much shorter duration; and in most cities the peak of mortality in 1920 is relatively insignificant as compared with the maximum rate in 1918. To this, however, there are several exceptions. In the South, Atlanta shows in the peak month of the 1920 epidemic an excess mortality rate from influenza and pneumonia nearly as high as was attained in the 1918–19 epidemic, and the same is more or less true of several cities in the Middle West; namely, Columbus and Toledo, in Ohio; Indianapolis; Detroit and Grand Rapids, in Michigan; Milwaukee, Minneapolis, and St. Louis. Also, in Portland, Oreg., and Seattle and Spokane, Wash., the 1920 epidemic was relatively severe, while that of 1918–19 was generally less severe than in the country at large.

In order to give a somewhat more concise comparison of different epidemics in individual cities, Table 8 has been prepared. This shows for each city the total excess mortality in each of the more distinct epidemics. This excess as computed from monthly rates is a very crude estimate, but the figures serve in some measure to give at least a rough idea of the relative severity of successive epidemics in the same city and of the same epidemic in different cities.

At the bottom of the table is shown for each epidemic period the mean of the excess mortality rates for all 50 cities, the median of the rates, the rates corresponding to the first and third quartiles, also the standard deviation and the coefficient of variability.

The mean is a simple average of the 50 rates which enter into it. It, therefore, differs from the total excess rate given in Table 7 for the corresponding period, since that rate is weighted according to population.

Table 8.—*Total excess*[1] *mortality from influenza and pneumonia per 100,000 population during each of 12 epidemics in each of 50 large cities in the United States, 1910–1929*

[Computed from monthly excess rates]

Cities (arranged geographically)	1915	1916	1917	Spring, 1918	Winter, 1918–19	1920	1922	1923	1925	1926	Spring, 1928	Winter, 1928–29
Boston	6.0	36.1	25.3	34.1	686.5	98.8	24.3	53.0	15.0	24.7	20.2	53.1
Cambridge *	0	24.6	18.8	36.6	516.3	74.5	28.3	43.9	15.9	18.4	0	12.2
Fall River	23.3	67.2	51.3	0	696.6	49.7	60.2	16.1	12.2	14.5	6.0	54.4
Lowell *	31.0	25.8	37.4	62.3	525.3	101.9	19.2	81.4	18.6	24.1	17.6	34.3
Worcester	10.0	64.1	20.5	26.5	606.6	105.3	18.8	33.0	6.4	45.9	29.4	5.9
Providence	20.7	33.5	33.7	29.0	618.0	105.2	27.8	29.5	6.9	22.9	9.8	34.7
Bridgeport *	14.3	123.3	155.2	63.5	709.7	112.9	23.5	20.8	0	40.0	11.1	44.4
New Haven	7.8	38.7	25.6	22.5	583.7	122.7	39.1	30.3	7.6	19.3	31.6	22.3
Albany *	27.1	32.5	11.5	8.0	589.0	57.2	32.4	58.7	6.0	41.8	19.2	65.8
Buffalo	14.9	17.1	26.3	21.7	531.1	85.8	13.9	29.8	8.8	34.0	22.0	63.8
New York	8.1	20.0	17.2	23.3	462.6	97.1	23.7	23.1	12.2	35.2	33.5	42.3
Rochester	8.4	0	21.4	23.8	394.3	44.4	20.5	26.7	4.3	44.9	4.2	21.4
Syracuse	8.7	13.3	10.3	37.7	454.1	135.9	0	30.2	12.2	21.8	24.9	50.0
Jersey City *	19.5	34.2	24.0	41.4	664.0	105.3	16.0	22.4	5.4	39.3	33.6	41.4
Newark	5.9	24.2	28.7	45.4	551.4	103.8	20.3	28.8	8.5	30.9	22.2	44.6
Paterson *	0	48.8	24.2	12.4	612.4	70.5	36.6	36.4	10.8	32.3	15.3	38.3
Philadelphia	11.7	52.7	60.0	77.8	768.5	88.5	5.5	41.7	6.9	34.9	11.1	34.3
Pittsburgh *	8.7	86.9	88.8	192.0	1,008.7	147.2	24.4	90.0	2.2	9.5	14.4	127.6
Scranton *	12.9	23.8	28.6	64.2	753.5	122.2	28.2	26.4	50.4	25.2	09.3	14.6
Baltimore	11.3	39.4	24.9	39.2	632.9	73.5	1.6	30.6	13.9	30.6		45.9
Washington, D. C	30.5	21.1	15.1	49.9	572.3	105.7	0	83.2	0	22.7	3.4	27.5
Richmond	12.1	34.9	15.9	9.7	551.3	74.0	4.9	14.5	0	60.9	0	44.0
Atlanta	5.6	0	0	71.7	358.7	128.0	14.6	42.4	38.2	10.5	6.8	86.6
Cincinnati	6.4	27.5	18.0	33.6	534.8	70.2	26.0	47.3	20.3	38.4	23.7	70.5
Cleveland	13.3	61.8	68.8	44.8	568.2	87.3	7.9	23.9	3.6	36.1	9.5	53.6
Columbus	9.9	44.2	34.4	16.0	368.1	139.7	15.1	85.9	40.7	7.9	5.5	79.6
Dayton *	10.7	15.2	10.0	14.4	420.3	86.5	5.4	49.2	15.4	26.5	13.7	38.4
Toledo	7.5	40.2	45.2	20.1	350.6	74.1	13.2	28.0	6.3	17.3	20.0	65.8
Indianapolis	16.0	23.5	12.7	38.4	392.8	118.2	29.6	41.2	23.7	17.8	29.0	70.9
Chicago	0	22.0	12.0	6.9	380.5	112.8	0	23.2	0	16.3	23.5	30.5
Detroit *	0	20.4	42.3	24.0	338.0	198.3	17.6	51.7	0	57.0	15.0	45.5
Grand Rapids	22.4	18.0	9.9	22.5	198.5	74.7	6.4	57.4	9.3	18.5	10.4	51.5
Milwaukee *	13.6	57.0	63.4	33.1	368.4	111.1	0	31.4	22.3	21.6	26.7	46.0
Louisville	20.7	37.1	32.7	87.2	611.4	62.0	16.3	34.4	3.7	45.8	28.4	52.0
Memphis	0	29.2	29.1	40.0	565.3	97.9	11.2	76.8	21.9	9.4	9.4	95.0
Nashville	0	10.2	0	124.9	688.6	121.8	10.8	65.8	3.3	93.1	43.1	81.7
Birmingham	0	8.2	100.2	195.0	643.4	135.3	0	6.2	71.2	84.3	46.9	137.4
Minneapolis	0	28.0	16.6	31.9	310.0	103.3	7.9	19.6	15.9	18.8	16.0	38.0
St. Paul	8.7	22.4	14.1	25.3	385.3	94.5	12.4	28.8	13.2	6.8	61.8	69.9
Omaha	7.4	71.5	71.8	29.8	550.8	102.7	16.3	40.3	12.6	14.6	6.7	50.7
Kansas City, Mo	13.5	37.9	65.2	76.1	652.3	205.3	29.0	38.3	21.0	8.3	5.7	41.6
St. Louis *	0	39.0	59.5	41.0	384.8	113.9	20.0	20.6	8.4	20.9	17.6	30.4
New Orleans	27.5	20.3	7.9	21.9	709.3	62.6	7.8	9.1	8.7	44.1	36.0	85.3
Denver	12.2	42.7	13.8	50.2	629.7	138.4	20.3	18.5	25.3	6.7	12.0	86.5
Los Angeles	0	7.1	0	0	500.7	20.6	30.9	7.3	4.8	4.5	17.9	79.4
Oakland *	0	3.9	7.6	25.0	507.3	92.6	18.0	11.0	0	6.8	0	29.2
San Francisco	0	0	5.4	22.7	635.6	93.6	35.4	14.9	3.8	8.9	0	6.8
Portland, Oreg	0	6.9	9.0	37.0	505.9	67.5	38.3	22.9	6.5	4.3	0	33.7
Seattle *	6.3	0	4.2	27.2	419.9	89.7	17.6	0	7.4	9.0	0	42.7
Spokane *	0	9.5	18.2	12.4	490.4	126.6	39.3	0	5.5	12.0	20.4	89.6
Mean [2] of rates	9.89	31.32	30.73	41.88	539.4	100.5	18.73	34.93	12.74	26.86	16.89	52.37
Standard deviation	8.67	23.56	28.96	38.73	145.3	33.22	12.56	21.72	13.39	18.88	13.28	27.34
Coefficient of variability [3] (per cent).	87.7	75.2	94.2	92.5	26.9	33.1	67.1	62.2	105.1	70.3	78.6	52.2
First quartile	0	17.1	12.0	22.5	419.9	74.5	7.9	20.8	4.8	12.0	6.7	34.3
Median	8.7	26.7	22.7	32.5	551.1	100.4	17.8	30.0	8.6	22.3	15.2	45.7
Third quartile	13.6	39.4	37.4	45.4	632.9	118.2	27.8	43.9	15.9	36.2	23.7	69.9
Lowest rate	0	0	0	0	198.5	29.6	0	0	0	4.3	0	5.9
Highest rate	31.0	123.3	155.2	195.0	1,008.7	205.3	60.2	90.0	71.2	93.1	61.8	137.4

[1] Excess over the median monthly rate for the period 1910-1916 for epidemics prior to July 1, 1919, and excess over the median monthly rate for the period 1921–1927 for epidemics after July 1, 1919. The period considered as epidemic varied in the different cities, all positive deviations being included for months when the rate was definitely above the median.

[2] Simple (unweighted) average of the 50 rates.

[3] Per cent that the standard deviation is of the mean.

* Cities marked with asterisk (*) are not included in the group of 35 cities, because continuous weekly data from 1918 to 1930 were not available.

Appendix

TABLE A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*

[Prior to July 1, 1919, the excesses are computed as deviations from the median death rate for the corresponding month for the period 1910–1916. After July 1, 1919, the excesses are computed as deviations from the median death rate for the corresponding month for the period 1921–1927]

[Cities marked with asterisk (*) are not included in the group of 35 cities, because continuous weekly data from 1918 to 1930 were not available]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	1. Albany, N. Y.*											
1910	−188	−80	+98	+27	0	+29	+83	0	+2	+48	+12	+135
1911	+88	+71	0	0	−48	+4	−11	0	−34	−11	−37	−31
1912	−53	+43	+44	+57	+43	−9	0	+57	+61	0	+80	+105
1913	0	0	−97	−17	+28	+25	+34	−12	−35	−24	−16	−58
1914	+97	−65	−55	−55	−30	−69	−12	−13	0	−2	−52	−70
1915	−62	−92	+186	+137	+2	0	−23	+42	−1	+31	+4	+5
1916	+234	+160	−53	−96	−88	−25	+42	+19	+42	+50	0	0
1917	+99	+41	−56	−10	+49	+7	+51	+8	−3	+38	−24	+40
1918	−106	−21	+4	+97	−69	−5	−13	+49	+51	+5,005	+640	+280
1919	+163	+230	+367	+201	−7	+5	−9	−8	+23	+26	+4	−2
1920	+15	+705	−33	−59	+87	+22	+1	−18	+44	−6	−61	−3
1921	−111	−23	−180	−124	−7	−11	−20	−8	0	−17	+77	+26
1922	0	+145	+85	+23	+44	0	−20	+12	+10	+44	−51	+35
1923	+212	+389	+93	−41	+22	+10	+41	+12	−11	−38	−62	−98
1924	−113	0	0	0	−8	+30	+10	−19	−22	+32	0	−38
1925	−74	−28	−62	−64	+71	−1	−10	+1	+30	+11	+40	+31
1926	+14	+26	+383	+89	0	+19	+20	−29	−2	−39	−43	0
1927	+12	−107	−85	+67	−10	−22	0	0	+8	0	+28	−1
1928	−97	−47	−105	+15	+137	+38	+29	+10	+18	+29	+47	+155
1929	+456	+129	−19	−78	+28	------	------	------	------	------	------	------
Median:												
1910–1916	317	313	312	263	164	92	34	35	58	69	145	216
1921–1927	224	194	272	188	89	53	30	39	53	89	125	169
	2. Atlanta, Ga.											
1910	+17	+142	+102	+55	+8	+6	+1	+39	0	+15	+152	+132
1911	+141	0	0	+69	+39	+3	+35	−15	+28	+48	+112	+84
1912	+53	+143	+76	−20	−38	0	−18	+13	+11	0	0	+153
1913	0	−18	−23	−57	+5	+17	0	+51	−28	−12	+28	−97
1914	−67	−47	−33	0	0	−14	−23	−32	−15	−49	−75	0
1915	−26	+62	+10	0	−102	−57	−11	0	−31	−51	−45	−80
1916	−25	−95	−114	−65	−8	−58	+19	−40	+1	+24	−15	−26
1917	−31	+17	−190	−122	−13	−27	−59	+34	+31	−68	+102	+60
1918	+268	+117	−97	+321	−17	−48	+19	−4	+22	+1,347	+641	+818
1919	+1,217	+351	−62	−85	+9	−1	−20	−42	−31	−35	−51	−68
1920	+71	+1,287	+236	−69	+14	+6	+32	−2	+10	+22	−19	−55
1921	−131	−154	−124	−85	0	−20	−33	−16	−21	−4	−18	−48
1922	−30	−87	+169	+3	−45	−6	−24	+2	−19	+17	0	+71
1923	+429	0	−26	+25	−25	+19	+112	+11	+46	+83	+99	+37
1924	+122	+71	+209	+257	+75	+59	+25	+8	0	+63	+44	+55
1925	+75	+73	−37	0	+79	+70	−8	0	+8	−7	+56	0
1926	−12	+137	0	−6	+24	0	0	−27	−20	0	−26	−65
1927	0	−191	+81	−110	−18	−22	+3	−15	+32	−13	−7	−4
1928	−20	−77	−107	−27	+22	+44	+15	−12	+35	+13	−74	+643
1929	+379	−70	−18	−41	------	------	------	------	------	------	------	------
Median:												
1910–1916	255	293	389	257	181	111	90	59	78	136	207	276
1921–1927	284	374	311	237	131	90	73	95	80	112	217	264

TABLE A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
					3. Baltimore, Md.							
1910	+79	+75	−79	−47	−56	−17	−14	−24	−6	−40	+31	+7
1911	+46	−55	0	+33	0	−8	0	0	−2	+13	0	−41
1912	−44	0	+4	−95	−87	−30	−13	−13	−8	+15	−9	0
1913	−17	−4	−101	−23	+6	+60	+26	+30	+4	+31	+17	−27
1914	0	+64	+69	0	+25	0	+32	−23	0	−13	−24	−56
1915	−148	−61	−2	+138	−10	+19	+3	+5	+22	−30	+14	+6
1916	+215	+51	+111	+95	+1	+1	−1	+6	+12	0	−38	+5
1917	+51	+95	+58	+91	+11	+13	+11	+13	+37	+42	+26	+50
1918	+68	+211	+86	+69	−54	−6	−7	−38	+39	+6,210	+297	+208
1919	+413	+327	−51	−101	−74	−55	+11	−7	+6	−17	−48	−2
1920	−29	+927	−48	−75	−13	−1	−1	−25	−20	−49	−60	−68
1921	−142	−44	−34	−112	−74	−32	−10	+6	−24	−12	−50	−67
1922	−110	−125	+19	−88	−71	−41	+10	−22	−8	−23	−27	+6
1923	+80	+249	+49	−17	+3	+3	−2	+4	+12	+3	+14	−43
1924	−34	−8	−102	+13	−4	+11	+8	0	+9	0	+7	+86
1925	+78	+3	−29	+25	+25	+12	−3	−3	0	+19	+2	+7
1926	+141	+234	0	+18	+27	0	+2	+3	−16	−34	−36	−10
1927	0	0	+61	0	0	−37	0	−6	+4	+10	0	0
1928	−29	−58	−49	+8	−22	+16	+18	−1	+23	+5	−10	+100
1929	+380	+66	−75	−87								
Median:												
1910–1916	362	337	363	290	224	113	81	83	86	126	193	279
1921–1927	305	344	359	256	181	110	55	68	81	119	172	207
					4. Birmingham, Ala.							
1910	+42	+6	+75	+135	+136	+32	+74	+47	+27	0	+157	−17
1911	−39	−64	−67	0	0	+116	+27	0	+6	−4	−48	−63
1912	+92	+48	+23	−22	−3	0	−9	+6	+3	+67	+118	+83
1913	−42	−163	−46	−28	+17	+71	+37	+26	0	+37	−8	−56
1914	+25	0	+151	+78	+121	−13	−27	−31	−42	−75	+26	0
1915	0	+22	−88	−15	−13	−39	−21	−70	−44	−54	−41	+97
1916	−74	−180	0	+41	−8	−10	0	−20	−52	+54	0	+88
1917	+30	+147	+157	+164	+256	+155	+111	+98	+41	+77	+2[illegible]9	+309
1918	+341	+253	+95	+733	+219	+29	+24	+31	+52	+2,420	+1,435	+2,259
1919	+714	+332	+82	+152	+117	+101	+37	+2	+54	−17	−70	−16
1920	+27	+1,181	+465	−132	−66	−40	−11	−13	−2	−45	−106	−113
1921	−65	−22	−77	−244	0	−17	−20	+4	−11	−28	−117	−93
1922	−47	−28	−90	−241	−48	−13	+3	−4	0	0	−95	0
1923	+73	0	0	+23	−10	+27	0	0	+36	+2	+38	−68
1924	0	+143	+92	+8	+28	0	−37	−31	+9	−13	+160	+157
1925	+100	+248	+120	+27	+56	−45	+7	+31	+13	+7	+90	+58
1926	+79	+360	+322	0	+56	+23	+32	−11	−30	−24	−10	−73
1927	−80	−7	−73	−85	−49	+1	−5	+52	−14	+5	0	+17
1928	+101	+25	−15	−118	+351	+80	+1	−4	+6	−14	−65	+101
1929	+1,474	+51	−33	−210								
Median:												
1910–1916	328	374	356	184	102	77	58	85	82	106	180	246
1921–1927	318	253	349	381	190	128	102	78	76	136	241	308
					5. Boston, Mass.							
1910	0	+14	−11	+35	−32	−18	+14	−9	+30	+8	+42	+34
1911	−42	+92	−17	−31	+53	0	+31	−4	+4	−18	−4	−23
1912	+2	−5	+30	0	−1	−25	0	−20	+1	+57	0	+9
1913	+12	−9	+49	−24	+22	+25	−6	+7	−22	−33	−30	−10
1914	−4	−81	0	+40	+16	+19	−29	0	−30	0	+7	−36
1915	−64	0	+17	+56	−35	−3	+10	+14	−17	+6	−5	+110
1916	+290	+28	−21	−22	0	0	−12	+6	0	−8	+22	0
1917	+110	+102	+29	+23	+45	−9	−41	−36	−4	−2	+33	+3
1918	+95	+190	+65	+72	−30	−43	−1	−47	+2,662	+3,546	+200	+715
1919	+827	+224	+23	−42	−37	−63	−12	−11	+7	+18	−27	−31
1920	+151	+1,042	+36	+5	−8	−1	+1	−15	−8	+11	+10	+7
1921	−10	−61	−65	−18	−26	−4	−2	−7	−6	−4	−14	−35
1922	−2	+206	+100	−13	+10	−33	0	+3	+3	+18	+79	+70
1923	+221	+209	+51	−11	−38	0	+4	+10	−15	0	−6	+16
1924	−25	0	−89	+11	−14	+12	−16	−16	−15	+9	+3	+25
1925	+22	+143	0	+28	+5	+6	+6	0	0	+18	+26	0
1926	0	−16	+170	+119	0	−2	−14	−13	+2	−4	0	−3
1927	[illegible]	−14	−61	0	+12	+15	+2	+5	+6	−6	−1	−38
1928	−31	−48	+18	−18	+150	+83	+8	−18	−2	−2	−32	−2
1929	+[illegible]80	+264	+4	−41								
Median:												
1910–1916	305	306	314	294	220	140	108	96	124	150	176	262
1921–1927	220	223	264	198	157	89	63	68	83	104	136	178

TABLE A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
					6. Bridgeport, Conn.*							
1910	−94	0	−40	0	+57	+29	−32	+34	−43	−53	−41	0
1911	+6	−84	−6	−124	+13	0	−22	−36	−33	−56	−34	−54
1912	−122	−30	−6	−85	−59	−38	+19	+37	+20	+15	−16	−8
1913	+32	−31	+134	−81	−45	−73	+26	−18	−15	−21	+32	+12
1914	0	+68	+89	+44	−159	−14	−7	0	+33	+14	+5	−56
1915	−164	+98	0	+83	0	+50	0	−12	0	0	0	+155
1916	+446	+74	+193	+271	+259	+63	+72	+60	+36	+87	+147	+290
1917	+543	+329	+273	+125	+74	+1	+40	−7	+59	+26	+18	−93
1918	−94	+187	+410	+175	−55	−47	+11	+77	+46	+4,107	+2,098	+624
1919	+623	+551	+280	+76	−68	−102	+47	−22	+39	−6	0	−5
1920	+135	+1,179	+88	+7	+10	+85	+21	+67	+12	+25	+64	+17
1921	0	+2	0	−7	−34	0	−20	+17	+27	+23	−30	−11
1922	+48	+174	+72	−19	+17	−2	−5	+1	+9	+28	0	+47
1923	+198	0	−2	0	+36	−26	+23	0	0	−33	+35	−2
1924	−28	−41	−36	+26	−11	+41	0	−15	−8	−4	+10	−19
1925	+24	−33	+2	+13	0	−13	+13	−23	+13	+22	+43	0
1926	−63	+62	+128	+250	+24	+22	−9	−3	−10	0	−31	+18
1927	−25	−62	−54	−93	−53	+6	+4	+10	−3	−1	−33	+81
1928	−88	−55	+29	−6	+51	+73	+10	+16	+16	+24	0	−28
1929	+428	+102	−22	−83								
Median:												
1910–1916	334	279	303	260	218	136	66	69	78	133	147	252
1921–1927	173	181	188	169	120	49	36	30	38	48	95	113
					7. Buffalo, N. Y.							
1910	+7	−35	0	+66	+68	+23	0	+12	+15	+7	+49	+8
1911	0	0	−29	+49	+16	−7	+2	−11	−18	0	−9	−24
1912	−4	−48	−17	−64	−32	+30	+32	+28	+3	+27	0	+35
1913	+52	+81	−43	−73	−10	+49	−22	0	−15	−14	−1	−44
1914	−12	+16	+38	0	0	−7	−10	−30	0	−16	−17	−67
1915	−44	+26	+88	+66	−46	−22	+3	−3	+7	0	+38	+38
1916	+127	−16	+16	−72	+75	0	−8	+31	−2	+18	+28	0
1917	+113	+47	+74	+15	+36	+31	−24	−5	+21	+28	+50	−50
1918	+31	+52	+37	+146	−15	−6	+40	+1	+54	+4,264	+664	+386
1919	+681	+253	−12	−23	−44	−7	+21	+8	+24	−20	−29	−16
1920	−22	+915	+134	+15	+9	−25	−17	−16	+18	−28	−32	+11
1921	+19	−23	−48	−63	−34	−59	−4	0	−16	−3	−52	−78
1922	−5	+20	+138	+8	−17	−53	+2	+6	0	−11	−24	−11
1923	+123	+204	+45	−1	+31	+5	+4	−6	+9	0	0	+4
1924	−8	−13	−27	0	−25	−26	−5	+3	+13	+26	+6	+23
1925	−9	+34	−14	+41	+63	+7	−6	+11	−1	+5	+64	+41
1926	0	0	+188	+134	+70	+13	+3	−9	−2	+8	+33	−22
1927	+37	−15	0	−8	0	0	0	−14	+5	−12	−8	0
1928	−7	−12	+58	−42	+75	+65	+36	+28	+22	+47	+20	+159
1929	+469	+114	−5	+58								
Median:												
1910–1916	212	222	249	251	187	97	77	63	74	98	141	208
1921–1927	145	160	169	174	116	97	45	46	44	74	99	128
					8. Cambridge, Mass.*							
1910	+39	0	+49	+53	−32	+82	+1	0	+13	+36	+39	−50
1911	−63	+85	+2	−18	+79	−11	+23	+11	−45	−65	−32	−74
1912	−19	−47	−87	−87	0	−22	+12	−11	+47	+35	−9	+15
1913	+68	−41	0	+49	−56	+114	0	+10	0	−66	+70	+13
1914	0	+7	+20	+59	+53	−34	−22	−1	−23	+11	+1	−76
1915	−89	−55	−80	0	−3	0	−11	+54	−12	0	0	+22
1916	+239	+31	−47	−90	+30	0	−33	−1	+11	−77	0	0
1917	+181	+3	+38	−92	−26	+66	−22	−34	−35	−23	−58	−89
1918	+38	+242	−29	+97	+38	+44	−1	−45	+2,009	+2,808	+143	+580
1919	+607	−59	−84	−71	−27	+10	−16	−18	+14	+45	−6	−17
1920	+155	+670	+90	+8	+63	+23	−16	+3	+35	+23	−73	−7
1921	−19	−57	−61	−94	−24	0	−38	−19	−10	0	+13	0
1922	+60	+122	+163	0	+5	+41	+24	+1	+1	+40	0	+121
1923	+218	+60	+86	+39	−47	−13	+13	−20	0	−12	−2	+46
1924	−87	−103	−127	−99	+12	+18	−18	0	+20	−13	+17	−6
1925	0	+96	0	+103	0	+6	+11	+9	−1	+6	+25	+31
1926	+6	−113	+209	+7	−21	−35	0	−11	−2	+14	−47	−78
1927	−16	0	−16	−25	+16	−16	−19	+17	+7	−16	−29	−108
1928	−122	−141	−93	−66	+14	−65	−48	−12	−13	−17	−88	−108
1929	+144	−78	−104	−135								
Median:												
1910–1916	275	261	288	260	167	57	55	67	91	132	170	241
1921–1927	197	231	187	202	108	65	48	40	42	73	117	146

TABLE A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						9. Chicago, Ill.						
1910	0	+13	+66	+15	+86	+111	+41	+32	+23	+24	+64	+94
1911	+45	−20	0	+24	+6	−17	0	+30	0	+7	+31	0
1912	+9	+31	−9	−17	0	+38	+13	+30	+1	+39	+8	+56
1913	−14	+38	+60	0	+11	+60	0	−1	+13	0	0	−44
1914	−58	0	+16	+12	−9	0	−17	0	−12	−38	−38	−72
1915	−132	−56	−29	−35	−89	−2	−28	−10	−28	−25	−64	+172
1916	+87	−71	−88	−102	−72	−8	−21	−6	−21	−3	−39	−40
1917	−14	+14	+40	+20	+40	+31	+5	+6	+3	+21	−41	−100
1918	−168	−139	+11	+73	−78	−49	−46	−26	+48	+3,037	+531	+496
1919	+224	+101	+74	−59	−84	−27	+12	+1	0	−2	+12	+59
1920	+826	+540	−5	+15	+34	−3	−6	−1	−3	−9	+6	+8
1921	+15	−4	−80	−47	−25	−25	−5	−3	−6	0	−12	−9
1922	−22	+18	+11	+15	+1	−10	−4	−1	+1	+6	+4	+33
1923	+54	+190	+11	+34	+29	+2	+3	+1	+11	−5	+4	0
1924	−9	0	−43	−14	−13	+4	−7	0	+4	+1	−16	+23
1925	0	−6	0	+8	+9	0	+5	+7	−4	0	+17	−15
1926	−23	+7	+186	0	0	−12	+1	−5	0	−11	0	−8
1927	+9	−36	−71	−33	−14	+18	0	+6	−1	+5	−4	+11
1928	+9	−6	−6	+93	+136	+41	+12	+4	+13	+17	+7	+233
1929	+128	−7	−79	−44								
Median:												
1910–1916	344	330	321	281	214	102	93	64	94	121	189	251
1921–1927	149	169	224	167	113	71	43	39	46	67	95	117
						10. Cincinnati, Ohio						
1910	−9	+164	+121	−2	+26	−7	+4	−9	−6	+18	+45	0
1911	−40	−111	−17	+15	+28	−32	−4	0	+8	+1	+19	−16
1912	0	+32	+22	−58	−24	+3	−8	+33	0	0	+13	+167
1913	+120	−14	0	−24	+71	+32	+3	−5	−11	+36	−4	−28
1914	−7	+25	+95	0	−5	−21	−21	+4	−20	−3	−39	−5
1915	+75	0	−29	+48	−3	+3	0	−2	+4	−4	−27	+60
1916	+265	−16	−48	+42	0	0	+12	+1	+19	−13	0	+35
1917	+78	+109	−28	−12	+47	+27	−1	0	−3	+13	+5	−10
1918	+98	+17	+56	+223	+11	−25	−19	−6	+18	+2,140	+1,285	+1,520
1919	+52	+523	+793	+60	−28	−22	−1	−45	+10	−24	−44	−3
1920	+6	+675	+130	+2	+32	−17	−19	−4	−18	−39	−56	−100
1921	−42	−49	−74	−101	−7	0	+13	−25	0	−10	−5	−72
1922	−11	+270	+62	−66	−22	−39	−2	+1	0	+10	−12	+44
1923	+290	+248	0	+12	+36	+33	+21	−5	+21	−40	0	−41
1924	−32	+30	−84	−19	+1	−15	−5	−31	−3	−25	+39	0
1925	+45	0	+24	+177	0	−19	−8	+6	+26	+75	+73	−5
1926	+38	−58	+83	+258	+83	+23	+15	0	−7	0	−5	+26
1927	0	−40	−129	0	−3	+10	0	+3	+11	+11	+81	0
1928	−9	−47	−29	+115	+142	+28	−8	+11	+37	+51	+45	+31
1929	+722	+78	+6	−69								
Median:												
1910–1916	265	284	274	189	116	77	57	41	70	105	172	194
1921–1927	217	236	272	198	106	84	54	66	51	92	132	203
						11. Cleveland, Ohio						
1910	+26	0	+12	+21	+13	+26	0	−11	−5	−2	+11	+7
1911	0	+16	−49	−39	−33	−5	−14	−9	+9	−7	−19	−90
1912	−12	−42	−55	−52	−11	+8	0	+14	−27	0	−19	0
1913	+2	+19	0	−44	+8	+22	+12	0	+15	+25	0	−57
1914	−18	−11	−22	+2	0	−31	−4	−15	0	−23	−15	−44
1915	−13	+138	+30	0	−31	−8	−1	+16	−1	+29	+35	+139
1916	+345	+18	+39	+62	+66	0	+1	+19	+15	+59	+39	+48
1917	+151	+183	+179	+28	+60	+55	+31	+3	+11	+63	+17	+69
1918	+115	+18	+14	+220	+19	−15	+19	−6	+5	+2,033	+1,931	+1,132
1919	+464	+413	+543	+228	+43	+9	+3	+37	+16	−17	−5	−5
1920	+52	+897	+57	+45	+39	+1	+18	+9	+6	−12	−1	−1
1921	−24	0	−56	−55	−55	−33	−7	+2	−11	+14	−4	−5
1922	0	+49	+48	−12	−21	0	−9	−5	0	−15	−12	0
1923	+79	+203	+14	0	+8	+9	+8	+12	+23	0	+12	−30
1924	+7	0	0	+36	+6	+12	−9	−3	−7	−13	+25	+18
1925	−25	+12	−45	+3	0	−8	0	−1	+6	+15	+82	+6
1926	+23	−19	+186	+126	+8	−5	+27	+1	+5	+4	−12	+17
1927	−30	−30	−91	−65	−19	+5	+22	0	−9	−17	0	−58
1928	−50	−94	−39	−30	+86	+27	+4	0	+2	−16	−13	+169
1929	+449	+16	−62	−79								
Median:												
1910–1916	172	180	211	192	135	82	54	59	57	87	127	182
1921–1927	160	194	219	174	113	68	45	42	51	78	87	141

Table A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						12. Columbus, Ohio						
1910	−37	−65	+11	+78	+42	+18	+32	−21	−3	+34	0	+39
1911	+8	+7	+23	0	0	−23	−34	+3	−11	−1	+54	0
1912	+19	−40	−101	+13	−22	0	−10	+26	0	+27	−20	+5
1913	0	0	−52	−4	+39	+34	0	0	−20	0	−18	−113
1914	−17	−69	0	+15	+24	−10	+3	−7	+27	−8	−56	−48
1915	−5	+118	+10	−1	−52	0	−26	−14	+2	−20	−28	+14
1916	+479	+30	−6	−10	−5	+9	+16	+7	+40	+33	+52	−2
1917	+143	+265	+24	−26	+24	−4	−7	+16	−1	+35	−24	−8
1918	+16	+60	−49	+195	+10	−48	−24	−6	+40	+1,237	+1,054	+955
1919	+117	+215	+585	+103	+87	−13	+18	+13	+9	−18	−8	+14
1920	+142	+1,315	+109	+33	+58	+55	+12	+22	+8	−9	0	+1
1921	+27	−22	0	−42	0	−18	−4	−8	+11	+8	+20	−18
1922	−16	+76	+110	−55	−12	0	0	0	0	−18	−12	+34
1923	+287	+601	+145	+3	+23	+22	+22	+9	+18	−15	0	+17
1924	−28	−16	−7	−15	−11	−8	−2	−10	+12	+6	+15	+57
1925	0	+71	+327	0	+32	+7	−20	+2	−13	+27	−8	−2
1926	−16	−29	−4	+40	+54	−7	+17	−3	−5	0	+15	0
1927	+1	0	−24	+19	−13	+25	+7	+29	−1	−17	−8	−7
1928	−51	−16	−66	+10	+56	−38	−5	−8	+2	−23	−27	+267
1929	+572	+108	−7	−66								
Median:												
1910–1916	205	208	240	162	119	75	65	47	50	76	133	219
1921–1927	173	143	157	165	90	67	37	32	43	78	117	132
						13. Dayton, Ohio *						
1910	+4	−22	+76	0	+23	+65	+31	+11	+29	+23	+106	+101
1911	−52	−28	+19	+64	0	−9	0	0	−4	0	+8	+25
1912	−115	0	−16	−2	−2	0	+56	−2	−5	+35	−45	0
1913	0	+92	−13	+1	−33	−17	−2	+6	+3	−15	−20	−42
1914	−104	−26	0	+5	+10	−21	−39	−22	−7	−44	−60	−36
1915	+39	+64	+29	−37	−2	+41	−4	−14	+27	−45	0	+38
1916	+142	+2	−10	−15	+81	−5	+12	+2	0	+21	+6	−9
1917	+98	+22	0	−20	+26	+36	+2	+9	+15	+34	+35	+60
1918	+17	−38	+19	+124	+31	+1	+17	−25	+22	+3,123	+676	+655
1919	+97	+96	+256	+59	−34	−1	+35	+11	−24	+5	−35	−23
1920	+515	+538	+4	+2	+11	−5	−13	+3	−24	+3	−12	−25
1921	−83	−83	−91	−86	−21	−14	−13	+39	−10	−43	+2	−6
1922	+3	+44	+23	+43	0	−37	+1	−13	−18	0	0	+20
1923	+248	+324	+18	−38	+48	0	+22	−21	+3	+34	+13	−19
1924	−3	0	−55	+32	−10	+28	0	0	−19	−37	−47	0
1925	−48	+17	+166	0	−5	+26	−1	−14	+1	+3	+8	+23
1926	+77	−31	−2	+52	+140	+73	+39	+12	0	+2	−14	+13
1927	0	−55	0	+14	+5	−3	−2	+11	+26	−6	−9	−62
1928	−35	−12	−67	+11	+113	+29	+10	+23	+5	+12	+3	+193
1929	+219	+45	−89	−103								
Median:												
1910–1916	247	233	205	207	97	49	39	49	44	97	143	170
1921–1927	150	149	195	148	73	37	28	28	48	58	83	140
						14. Denver, Colo.						
1910	0	−71	0	+34	+42	+10	−19	−22	0	+25	−14	+79
1911	+231	+116	+44	−48	−31	−24	−3	0	−7	−4	+56	−61
1912	−27	−44	−29	+5	0	−3	+17	+15	−24	−1	−24	0
1913	−73	−53	−49	−26	−44	0	+11	−7	+12	−34	0	−10
1914	−46	0	+64	+55	+36	+20	0	+8	0	0	−34	−3
1915	−50	+50	+99	0	−16	−2	+29	+2	+30	+3	+114	+287
1916	+94	+14	−142	−54	+21	+17	−21	−4	+3	+11	+44	+64
1917	+57	−25	−43	−11	−15	−10	+12	−4	−18	−2	+6	−9
1918	−47	−44	+91	+268	+158	+19	+25	0	+39	+1,957	+2,063	+2,368
1919	+394	+296	+326	+69	−4	−26	−20	−16	−31	−23	−56	−19
1920	+326	+1,399	−53	−3	−7	+10	+34	+20	+39	+21	+93	+133
1921	+68	0	−89	−16	−23	+13	−8	0	+4	−18	0	−26
1922	−18	+8	+215	+17	+1	+39	0	−5	−29	−7	−7	+22
1923	+34	+132	+42	0	+20	−8	+8	−24	−21	−48	+12	−39
1924	−27	−156	+32	+142	0	−22	+24	+44	0	+24	+6	+86
1925	+31	−69	−91	+127	+18	+42	+18	+21	+41	0	+50	−17
1926	−65	+87	0	−32	−88	−12	−3	+16	−8	+6	−22	0
1927	0	−141	−107	−30	−93	0	−16	−2	+25	+16	−3	+16
1928	+28	−47	+7	+30	+67	+28	+11	+17	−31	−18	−63	+916
1929	+105	−73	−38	−76								
Median												
1910–1916	264	253	225	170	106	69	46	38	68	112	128	201
1921–1927	317	352	322	215	162	84	57	67	93	130	171	264

TABLE A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						15. Detroit, Mich.*						
1910	0	0	+44	+116	+13	+37	0	+10	−12	−26	+8	−5
1911	+11	+18	−52	−27	−13	−31	−13	−7	−20	0	−37	−42
1912	+15	−32	−11	−3	0	−5	+19	+11	+7	−3	+11	+71
1913	−11	+35	+4	+37	+59	+43	+44	+34	+10	+13	0	0
1914	−26	+7	0	0	−34	−21	−1	0	−23	−30	−36	−22
1915	−55	−71	−51	−27	−46	0	0	−2	0	0	+5	+177
1916	+64	−23	+10	+44	+55	+25	+31	−1	+17	0	0	+85
1917	+89	+36	+50	+64	+69	+21	+62	+27	+36	+23	+1	+10
1918	+25	+9	−15	+292	−17	−32	+4	−12	−11	+1, 351	+793	+679
1919	+617	+390	+195	+18	−36	−38	+6	0	+1	+8	−8	+55
1920	+640	+1, 497	+101	+96	+51	−9	+8	+11	−4	−6	−12	−19
1921	−46	−62	−103	−57	−28	−37	−9	+3	−12	−5	−45	−54
1922	−42	+80	+135	−37	−42	−12	−7	−7	−1	+17	+18	+45
1923	+130	+202	+1	+96	+101	+23	+33	+27	+25	+29	0	0
1924	0	0	−17	+72	+18	+7	0	+8	+8	−4	−23	+2
1925	+15	0	0	0	0	0	+5	−1	+4	+34	+22	+39
1926	+14	+26	+294	+190	+61	+2	+2	−5	−13	−12	+4	−6
1927	−24	−36	−45	0	−18	−1	−7	0	0	0	−27	−35
1928	−39	−44	−18	+105	+76	−19	−2	−7	+9	+8	−10	+218
1929	+307	+12	−16	+7								
Median:												
1910–1916	232	244	282	216	165	96	42	52	71	103	145	198
1921–1927	185	200	233	173	145	99	49	44	59	76	125	136
						16. Fall River, Mass.						
1910	−187	−141	−47	−40	0	+1	+40	+29	−10	+80	+40	+51
1911	−98	−86	+31	+92	+88	−71	−9	−1	+10	−19	−21	−127
1912	+1	+83	−27	−81	−30	−132	−49	0	+21	+80	0	+31
1913	0	0	−48	+356	+294	+51	0	−1	−31	+30	−1	+70
1914	+265	+87	0	−10	+48	0	+20	−1	0	−19	+50	−58
1915	−30	−153	+108	+172	−90	+10	0	+29	−51	0	−52	0
1916	+422	+313	+79	0	−21	−41	+20	+78	0	−39	+60	−39
1917	+292	+346	−11	−22	−80	−41	−69	−20	−41	−39	−22	−118
1918	−61	−175	−99	−12	−110	−173	−79	−11	+798	+6, 019	+403	+352
1919	+408	+279	+8	−63	−159	−112	−9	−43	+32	−12	−50	−17
1920	+92	+450	+73	−84	−8	+2	−28	−14	+21	−22	+20	+90
1921	+126	−35	0	+13	0	+21	0	+4	+1	−33	+7	+28
1922	−20	+360	+384	0	−30	0	−10	+23	0	−24	+5	+55
1923	+52	+32	+48	−31	−3	−30	+9	+12	−10	−34	−45	−41
1924	+40	0	−67	−52	+14	+37	−20	−53	−10	+40	−65	−5
1925	0	+56	+40	+41	+13	−21	−20	−44	+9	+2	0	+66
1926	−84	−138	−208	+177	−7	+24	+25	−44	+8	+10	−30	0
1927	−50	−21	−138	−67	+18	−32	+15	0	−11	0	+42	−73
1928	−96	−59	−193	−86	+8	+40	+24	−18	+26	−18	−115	+23
1929	+474	+156	−195	−79								
Median:												
1910–1916	325	381	432	305	247	193	108	40	112	88	133	255
1921–1927	219	247	316	195	115	78	38	53	29	71	151	144
						17. Grand Rapids, Mich.						
1910	+13	+11	−32	0	0	−20	+11	+21	+11	0	+1	+97
1911	+152	+109	+57	+220	+9	−31	+11	+10	+21	+20	0	−39
1912	−44	−32	−67	−24	−43	0	−10	−10	0	−22	−53	0
1913	−27	−41	0	−25	−44	−32	0	0	+19	+16	+58	−21
1914	0	−1	+26	−7	+33	+27	−10	+28	−11	+5	+5	−52
1915	−22	+59	+69	+80	+2	+26	+37	−1	−21	−15	−16	+70
1916	+143	0	−101	+29	−17	+82	−11	−10	−11	−62	−26	+12
1917	+105	−80	+31	+16	+61	−34	+7	+26	+7	−8	−19	+17
1918	−5	−13	−34	+213	+59	−25	+15	−1	+6	+395	+697	+1, 131
1919	+131	−34	+85	+75	−21	−25	−15	−21	−40	−12	+18	−3
1920	+19	+736	+62	+31	+38	+37	+10	+5	−31	+5	−27	−30
1921	−17	−26	−84	−75	−23	−16	+18	−30	+3	+20	+7	+1
1922	+22	+17	+38	0	−7	0	−16	+19	+2	−5	+5	+49
1923	+60	+188	+75	+48	0	+25	+8	+10	−24	−14	+21	−51
1924	−37	0	0	−37	−41	0	0	+2	0	−6	−38	−43
1925	−25	+8	−21	0	+11	+102	−24	0	−25	+31	0	0
1926	+12	−36	+52	+130	+40	−2	+14	−8	−33	0	−48	+21
1927	0	−39	−94	−82	+7	+13	−2	−16	+11	+27	−26	−12
1928	−30	−67	−37	−1	+92	+12	+19	−9	−12	+41	+18	+425
1929	+124	−11	−88	−32								
Median:												
1910–1916	154	139	157	86	73	52	20	10	21	62	74	90
1921–1927	109	128	159	127	73	25	24	38	49	38	71	107

TABLE A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						18. Indianapolis, Ind.						
1910	−43	+50	+30	+60	+36	+56	0	+7	+18	+13	+34	+11
1911	0	−12	−17	+13	−41	−23	−16	0	0	0	−52	−44
1912	+45	−60	−14	−3	−6	−14	+26	+4	−16	+50	+14	0
1913	−2	0	−9	−37	+3	+31	+10	+2	+1	−23	−15	−42
1914	−30	+28	+29	+96	0	0	+4	0	−1	−8	−23	+16
1915	+71	+112	0	0	−60	−28	−19	−36	−7	+8	0	+114
1916	+163	−8	+48	−11	+25	+5	0	−3	+8	−13	+25	−12
1917	+29	+133	+6	+25	+36	+6	+11	+3	+6	+45	−47	+19
1918	+69	+29	+19	+260	+74	+12	−6	−14	+64	+1,381	+1,046	+767
1919	+319	+338	+623	+156	+5	−5	−22	−11	−12	−49	−76	+20
1920	+190	+978	+97	+12	+95	+51	+18	−19	−29	−32	−43	−24
1921	0	−144	−148	−95	−44	−8	+2	−6	0	+7	−23	+16
1922	+47	+316	0	0	+34	−31	−17	0	−13	−17	−19	+4
1923	+101	+238	+111	+10	0	0	+3	−1	−3	−15	+17	−38
1924	+24	0	−32	−16	−13	+12	−19	−5	+34	0	+14	0
1925	−33	+93	+150	+47	−9	−17	0	+10	−20	+4	0	+49
1926	−4	−74	+38	+58	+49	+29	+28	+9	+6	+12	+4	−10
1927	−14	−102	−94	−44	+8	+30	−5	+14	+24	−9	−22	−29
1928	+35	−53	+30	+93	+151	+57	+16	+13	+26	+5	+17	+469
1929	+287	+70	−19	−48	-----	-----	-----	-----	-----	-----	-----	-----
Median:												
1910–1916	238	216	245	173	124	68	45	53	60	87	142	165
1921–1927	181	248	267	207	124	64	49	49	67	91	139	158
						19. Jersey City, N. J.*						
1910	−15	−64	−65	−19	0	0	−7	−5	−36	0	+56	+106
1911	+12	+10	+76	+140	−19	−19	−12	+7	+4	−2	0	+15
1912	+47	−68	−104	0	+10	+16	+21	+10	−11	−7	−24	−26
1913	0	+8	0	+97	+62	+58	+11	0	+14	0	−17	−94
1914	−28	0	+38	−32	−12	−9	−36	−34	0	−39	+37	−20
1915	−31	−105	+26	+43	+78	+88	0	+15	−14	+26	+52	+56
1916	+197	+80	−9	−32	−6	−15	0	−11	+36	+13	−9	0
1917	+178	+116	−58	+41	+20	−4	−26	0	+5	+51	+1	+44
1918	+52	−9	+211	+208	+34	+11	+37	−49	+132	+4,953	+791	+262
1919	+545	+524	+565	+130	−12	−23	−6	+15	+59	+30	+43	+15
1920	+263	+989	+46	−34	−5	−7	−27	−5	+17	−10	−27	+1
1921	+12	0	+38	0	+1	−20	−19	+17	−4	−12	−29	−32
1922	+10	+198	−11	−22	0	−23	−27	−6	0	+30	+26	+9
1923	−26	+236	+47	+4	−32	+7	+7	+54	−9	−40	+1	−12
1924	−9	−10	0	+45	−2	+33	+17	+1	+22	+31	0	+63
1925	0	−25	−41	−39	+30	−11	−21	0	+37	0	+34	0
1926	+60	+87	+227	+55	+43	0	+5	0	+25	+2	−6	+21
1927	−34	−86	−59	−39	−10	+11	0	0	−6	−32	−34	−32
1928	−32	+60	+34	+126	+120	+59	+7	+14	+20	+4	+11	+76
1929	+315	+94	−59	−101	-----	-----	-----	-----	-----	-----	-----	-----
Median:												
1910–1916	305	302	297	227	175	113	99	97	104	123	175	280
1921–1927	217	232	246	205	131	84	62	37	48	105	117	164
						20. Kansas City, Mo.						
1910	−10	−1	+59	+11	+47	+19	+35	+1	+1	+3	+15	+90
1911	+236	+88	+13	+33	+29	+2	−13	+27	+9	+1	+43	0
1912	+12	−23	−42	0	−37	−27	−13	−24	−21	+3	−40	+8
1913	−1	+63	0	−64	−4	−19	−1	−7	−4	0	−16	−58
1914	0	−52	−15	−2	+31	−20	+10	0	−10	−6	−24	−32
1915	−23	+51	+57	+68	−22	0	+1	+3	+14	−25	+53	+318
1916	+79	0	−9	−3	0	+7	0	−2	0	−6	0	−20
1917	+135	+168	+197	+147	+75	+41	+26	+4	−10	−13	+16	+56
1918	+144	+99	+352	+162	+82	+3	+1	−16	+59	+2,271	+1,401	+2,201
1919	+546	+489	+518	+268	+22	+9	+19	0	+31	+35	+15	+35
1920	+871	+1,613	+8	−55	+8	+29	0	+46	−8	−66	−7	−5
1921	−40	−50	−195	−111	−20	−9	−29	−9	+2	+7	0	−54
1922	0	+378	0	+10	+32	+10	−13	0	−7	+11	−7	+36
1923	+49	+329	+15	+63	−2	−23	0	+15	−1	−22	+56	+28
1924	−6	−61	−128	−55	−17	+27	−1	−29	+8	−37	−15	−2
1925	+40	+154	+68	0	+9	−11	+14	+15	0	−13	+28	0
1926	−50	0	+28	+72	0	0	+31	−14	+21	0	+8	+75
1927	+5	−62	−159	−119	+37	+18	+30	+28	0	+4	−43	−34
1928	−30	−136	−123	+1	+37	+32	−32	+8	−16	−44	−38	+399
1929	+31	+65	−111	−133	-----	-----	-----	-----	-----	-----	-----	-----
Median:												
1910–1916	255	251	224	184	99	59	40	46	62	86	136	183
1921–1927	229	236	377	252	129	[illegible]	47	55	60	[illegible]	141	163

TABLE A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

21. Los Angeles, Calif.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1910	−30	+3	−3	0	+27	−25	−17	−29	+19	+4	−29	+6
1911	+24	+19	+35	−2	0	0	+7	+27	−11	0	−5	−19
1912	0	0	+12	+53	+11	0	+19	−5	+19	+40	+24	+65
1913	+95	+69	+43	+32	+23	+25	+17	+1	+12	0	−13	−38
1914	−32	−48	−16	−20	−13	+9	−12	+6	−15	−12	0	−50
1915	−61	−67	0	−30	−10	−7	0	−3	0	+18	+38	0
1916	+30	−15	−21	0	−6	−23	−34	0	−23	−12	+14	+2
1917	−9	−42	+9	+9	+4	−4	−45	−17	−3	+15	+18	+14
1918	−59	−6	+6	+5	+25	−20	−15	−7	−1	+1,653	+2,035	+981
1919	+1,103	+55	+65	+77	−19	−31	−30	−34	−23	−26	−29	−29
1920	+3	+347	+21	−16	−28	+3	−24	−27	−13	−18	−38	−35
1921	−55	−92	−56	−30	−28	−24	−29	−15	−9	−19	0	−1
1922	−36	+155	+215	+8	−12	−14	−14	0	−9	−11	−14	−8
1923	0	+29	+60	0	+4	0	+12	−2	0	+10	−6	+8
1924	+10	−76	0	+28	+12	+13	−9	+11	+18	0	+5	0
1925	+56	0	+32	0	+26	+14	+2	+9	+7	−22	−2	−3
1926	−8	+59	−29	−9	−26	−12	0	−3	−14	+2	+26	+43
1927	+18	−45	−22	+2	0	+41	+27	+15	+4	+19	+8	+34
1928	+102	+65	+14	+40	+26	+47	+10	+23	+49	+52	+229	+531
1929	+79	+6	+92	+60								
Median:												
1910–1916	190	154	101	90	78	70	61	51	60	58	93	165
1921–1927	165	201	151	112	101	68	64	59	53	81	91	132

22. Louisville, Ky.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1910	+94	+64	−87	−43	+95	−3	+17	+12	+17	+11	−1	+31
1911	−37	−93	−77	+85	+58	−36	−4	+17	−5	−31	+41	−27
1912	−37	−48	+63	+21	0	+2	−4	+6	+1	0	−45	−1
1913	−4	+13	+48	−20	+45	+43	0	−15	0	+45	+49	−14
1914	0	−5	+174	0	−7	+37	0	−5	−21	+3	0	+113
1915	+131	0	0	−11	−7	0	+36	0	0	−7	−42	0
1916	+391	+51	−21	+10	−12	0	+36	−25	−11	−2	+10	+15
1917	+215	+65	+33	+30	+48	−16	+15	+5	−6	+53	+61	+110
1918	+183	+259	+37	+305	+52	−22	+60	−41	+72	+2,561	+961	+1,092
1919	+247	+763	+1,502	+59	+52	−12	+31	+51	−6	−7	−43	+2
1920	+86	+605	+80	−55	−19	−4	−14	+20	+3	−3	−14	+34
1921	−91	−76	−109	−115	0	+2	−11	0	−14	−1	0	−16
1922	0	+212	−34	0	−21	−41	−18	−3	−15	−13	+29	+17
1923	+189	+189	0	+28	+46	+4	+6	+62	0	+55	+19	0
1924	−27	+3	+6	+17	+1	−44	0	−1	+23	−21	−19	−20
1925	−40	0	+44	−18	−15	0	−5	−10	0	+20	−23	+38
1926	+54	−100	+358	+110	+23	+17	+35	+1	−9	+29	+5	+56
1927	+17	−121	−83	−43	−40	−16	+37	+22	+16	0	−15	−35
1928	−42	−75	+45	+60	+58	+26	+21	+129	−5	+34	−45	−2
1929	+614	−163										
Median:												
1910–1916	235	254	275	216	109	79	56	56	53	104	158	188
1921–1927	200	255	256	203	128	81	44	29	68	77	152	149

23. Lowell, Mass.*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1910	+21	+99	+68	+111	+2	+1	−42	+36	+35	+26	+115	−59
1911	−3	0	0	−62	−43	−22	−20	−20	0	+3	0	−38
1912	+18	−34	−122	−73	0	0	−20	+2	0	+24	−1	+38
1913	−18	−112	−145	−64	+21	+44	+34	+23	+22	−42	−47	+3
1914	−106	+31	+16	+25	−45	−23	+12	−31	−12	−21	+19	−42
1915	0	−54	+143	+134	+93	−35	0	−10	−24	0	−15	0
1916	+181	+132	−137	0	−46	+20	+11	0	+9	−11	+139	+21
1917	+60	+84	−54	+9	+133	+9	−43	−21	+9	−12	−28	+8
1918	−59	+222	+219	+160	+78	+19	+62	−21	+988	+4,012	+222	+270
1919	+495	+265	−46	−48	−91	+8	−10	+11	+12	−39	−51	+14
1920	+2	+866	+252	+146	−16	+23	+22	−10	+1	−18	+3	−28
1921	0	0	0	−38	−17	−10	−10	−20	+1	+23	−9	+64
1922	+9	+170	−63	+14	+24	+11	−31	−20	+1	+2	+1	+1
1923	+110	+338	+232	+171	+95	+32	+20	+20	0	+42	+11	0
1924	+28	−8	−126	−19	−28	0	0	0	−21	−40	0	−10
1925	−75	+52	+126	0	−9	+20	+60	+20	0	−40	+103	+9
1926	−76	−27	+44	+155	+91	−12	+9	+9	0	0	−106	−22
1927	−77	−61	−48	−54	0	−53	−11	−11	+20	−11	−86	−63
1928	−87	−23	−98	−23	+199	+8	+19	−31	+10	+19	−55	−3
1929	+208	+211	−40	−45								
Median:												
1910–1916	322	268	308	232	164	79	64	53	68	118	148	236
1921–1927	217	172	228	188	110	74	41	41	42	91	148	143

TABLE A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						24. Memphis, Tenn.						
1910	0	0	+84	−6	+47	−5	−6	+15	+48	−30	+105	+237
1911	+118	+34	+121	+72	0	+30	+37	+22	+11	+4	0	0
1912	−105	+9	+107	+41	−2	+2	−25	+4	+28	+12	+16	+215
1913	+61	+24	−12	0	+55	+36	0	−32	0	−33	+4	−16
1914	−88	−46	0	+40	+52	0	0	−15	0	0	−25	−3
1915	−17	−4	−113	−25	−51	−36	+15	0	−1	−2	−105	+259
1916	+86	−97	−165	−113	−60	−28	−18	−41	−10	+14	−81	−68
1917	+70	+229	+66	−82	+75	−3	+30	−34	+7	−4	+26	+34
1918	+184	+45	+29	+113	+48	−12	+69	+6	+47	+4,091	+451	+524
1919	+963	+379	+252	+10	+53	+36	−21	−22	−33	−14	+37	+62
1920	−19	+1,046	+131	+47	−11	−67	−26	+3	−8	−32	−65	+13
1921	−174	−293	−219	−135	−43	−46	−41	+31	−17	−26	−67	−98
1922	+27	+116	−123	−159	−31	−33	0	−13	−18	−21	−11	−38
1923	+437	0	+288	+119	+50	+9	+6	0	+38	+47	0	+8
1924	−23	+58	0	+108	0	0	+46	−7	+1	+24	+48	+39
1925	+52	−50	−27	+101	+24	+47	−23	+12	0	−39	+93	+7
1926	0	+84	+35	0	+1	−17	+23	+18	−36	0	−49	−43
1927	−129	−259	+155	−58	−14	+16	−5	−3	+24	+31	+24	0
1928	−118	−275	−139	+70	+44	−31	−22	−13	+5	−41	−40	+233
1929	+889	−182	−124	−99								
Median:												
1910–1916	358	317	346	274	159	70	51	66	35	93	191	273
1921–1927	366	521	418	289	192	127	84	69	98	140	207	276
						25. Milwaukee, Wis.*						
1910	0	−3	0	+27	+47	+15	−5	0	−7	0	+4	−15
1911	−62	−37	−61	−3	−27	−38	−1	−5	+7	−28	−20	−84
1912	+19	+25	−85	+50	−20	+28	+4	+6	0	+4	0	+28
1913	+59	−14	−59	0	+36	+8	0	+17	−19	−9	+15	−22
1914	−26	0	+35	−1	0	−32	−4	−2	−11	−11	−21	0
1915	−32	+77	+91	−2	−61	−25	+21	−11	+14	+35	+17	+239
1916	+163	+52	+29	+117	+80	0	+9	+16	+2	+14	−30	+66
1917	+138	+199	+158	+150	+57	+12	+7	−13	+34	+15	−29	−16
1918	−24	−22	−21	+331	+70	−3	+46	−13	+76	+1,302	+823	+1,516
1919	+130	+22	+199	+279	+32	+15	+20	+26	+6	+5	+29	+76
1920	+568	+706	+8	−4	−11	+17	+14	+2	+10	−19	+22	+14
1921	−5	−8	−69	−88	−48	−47	+13	+36	−14	−22	−3	−26
1922	−20	0	0	0	+34	+1	−12	−4	−2	−8	−51	0
1923	+54	+291	+44	+10	0	0	−6	−12	+7	+13	+4	−14
1924	−19	+3	−30	−13	−12	+6	−1	+14	+4	−15	0	+16
1925	+7	+27	+80	+163	+7	−2	+2	+15	0	+36	+11	+24
1926	0	−14	+65	+134	+39	+16	+6	0	+18	+12	+17	+45
1927	+17	−38	−35	−43	−47	−19	0	−19	−3	0	−1	−4
1928	+10	−43	−82	+99	+130	+51	+38	−6	+10	−7	−27	+168
1929	+330	+48	−24	−18								
Median:												
1910–1916	182	194	245	177	147	82	49	53	52	82	132	153
1921–1927	148	150	197	181	141	83	42	34	48	70	94	101
						26. Minneapolis, Minn.						
1910	−115	−55	0	−43	0	+37	+21	+22	+42	+52	−1	+105
1911	+78	0	−15	+44	+16	−44	0	−6	−23	−23	+4	−11
1912	−91	−51	−18	+1	−43	−18	−23	−3	0	+21	+1	−7
1913	+49	+2	+15	−55	−16	0	−13	0	−2	−3	−28	0
1914	0	+5	+77	+51	+6	+5	+18	+2	+8	+13	+3	−10
1915	−101	+8	−10	−32	−34	0	+2	−9	+7	0	0	+261
1916	+70	−7	+11	0	+18	−9	−15	0	−8	−11	−13	+51
1917	+66	−5	+79	−21	+21	0	−29	+2	−6	+4	+28	+7
1918	−100	−48	+7	+333	+53	+8	−14	−27	+36	+1,207	+881	+851
1919	+200	+160	+254	+93	+15	−23	+1	+6	−17	−9	−3	+52
1920	+261	+962	+7	−60	+29	+39	0	−11	−8	−19	−14	+12
1921	0	+95	0	−54	−19	−19	−19	−5	+35	+31	−16	0
1922	−32	0	+93	−81	0	−1	+13	+24	0	−12	−3	+50
1923	−9	+224	+28	−71	−10	−14	−5	−15	−13	−28	+1	−19
1924	+20	−8	−29	0	+23	0	0	−7	−2	−14	+2	−41
1925	−33	−16	+95	+59	+20	+16	−1	+12	−17	+18	0	+38
1926	+24	−15	−13	+41	+72	+48	+34	+17	+13	0	+15	−12
1927	+22	+17	−28	+9	−3	+53	+8	0	+8	+40	−10	+45
1928	−7	−25	+4	+92	+89	+12	+15	+9	+2	+5	+10	+198
1929	+221	+32	−61	−81								
Median:												
1910–1916	228	197	140	159	113	71	49	40	50	68	117	140
1921–1927	144	114	162	181	85	50	37	32	46	68	100	123

TABLE A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						27. Nashville, Tenn.						
1910	+183	+102	−105	−8	+56	+68	+45	+98	+79	+12	0	+128
1911	+158	+52	+189	+154	+51	−20	−20	+2	−42	+32	+86	+30
1912	−44	0	+82	0	0	−31	−9	−30	−10	0	+9	+155
1913	−162	+11	−58	−24	−117	+22	+1	−20	+22	−43	+50	−58
1914	−101	−50	+137	+39	+38	+32	0	+32	0	−33	−59	−101
1915	0	−29	0	−101	−118	0	0	−20	+10	+38	−50	0
1916	+121	−109	−43	+36	−108	−11	−1	0	−43	−24	−103	−32
1917	−25	−1	−56	−61	−38	−12	−11	−31	−23	+67	+22	+6
1918	+141	+103	+113	+728	+163	+207	+49	+70	+60	+5, 233	+717	+770
1919	+379	+424	+349	+121	+50	+80	−47	−9	+9	−58	−60	−18
1920	+45	+1, 149	+246	+71	+5	−80	−27	+1	+19	−49	−71	−39
1921	−37	0	−194	−105	−36	−50	−28	0	−2	+29	−62	−51
1922	0	−57	+127	−76	−7	0	+41	−69	−33	−1	−32	−43
1923	+456	+44	0	+283	0	−32	−19	+36	+26	+35	+4	−28
1924	−6	+59	+27	+38	+19	−2	0	−2	−43	−42	−16	+30
1925	−52	−82	−107	0	+20	+6	+11	+25	0	0	+2	+10
1916	+273	+2	+381	+132	+174	+41	+88	−10	+79	−9	+55	0
1927	+13	−114	−180	−136	−24	+14	−7	+15	+61	+16	0	+178
1928	+145	−152	−81	+47	+110	+30	+1	+22	+16	−53	+7	+123
1929	+796	+49	−109	−43								
Median:												
1910–1916	360	405	350	250	200	64	62	51	75	116	209	298
1921–1927	303	360	470	268	144	101	67	79	63	138	194	258
						28. Newark, N. J.						
1910	+125	0	+31	+58	+29	−21	0	−16	0	−13	0	+130
1911	+28	0	+8	+21	+12	−23	−4	+30	+5	+19	−37	−7
1912	0	−32	−42	−10	−1	+13	−21	−4	+4	+49	+15	+45
1913	−38	+20	0	−54	−26	+11	+7	−2	−5	−24	+1	−34
1914	−48	+202	+54	0	+87	+54	+24	0	+11	+12	+24	0
1915	−77	−53	−56	+72	−43	0	−5	+5	0	−20	−11	−14
1916	+234	+55	−57	−54	0	−1	+37	+34	−19	0	−10	+58
1917	+150	+102	+39	−43	+27	−6	+26	+2	−5	−5	−1	−36
1918	−21	+86	+255	+116	+27	+34	+30	−22	+48	+3, 929	+996	+633
1919	+453	+297	+188	+10	−22	−57	−18	−2	−3	−25	−3	−3
1920	+196	+914	+88	+47	+40	−9	−7	−17	+14	−20	−22	+24
1921	−19	−26	−34	−34	−43	−24	−8	0	−16	−38	−27	−37
1922	+24	+222	+15	−8	0	−30	0	+2	+1	0	+11	+43
1923	+21	+201	+82	0	−23	0	−9	−4	0	+1	−13	0
1924	0	−14	−46	−16	+15	+7	+1	−2	+10	+27	0	+24
1925	−9	0	0	+22	+63	+16	−5	+7	−15	+36	+6	−7
1926	+35	+23	+210	+77	+24	+15	+10	+14	−16	−15	+17	+6
1927	−42	−22	−16	+11	−18	−2	+1	−9	+28	−10	−18	−37
1928	−24	+30	+19	+22	+113	+49	+8	+25	+9	+9	+1	+77
1929	+409	+44	−24	−32								
Median:												
1910–1916	283	220	296	242	157	98	57	63	63	94	157	235
1921–1927	191	170	200	169	104	67	52	42	53	71	107	140
						29. New Haven, Conn.						
1910	0	+16	−83	+17	+22	−10	−11	+38	+18	+37	+32	+53
1911	+68	+46	+194	+53	−8	−4	+13	−16	+33	+8	−52	−83
1912	−151	+122	+235	−32	+65	+29	−5	0	+22	+14	−62	−2
1913	+32	−72	−10	−82	+10	0	−7	−1	−15	−22	−5	0
1914	−90	−97	0	−21	−18	+48	0	+22	0	0	0	−21
1915	−64	−24	−87	+95	−5	−45	+30	−35	−59	−10	+38	+124
1916	+233	0	+64	0	0	+26	+51	+42	−28	−28	+99	+94
1917	+112	+5	+40	−55	+26	+94	−13	+17	−6	+31	−1	+41
1918	−2	−36	+40	+163	+67	−48	−21	−45	+62	+4, 125	+1, 304	+944
1919	+481	−26	−92	−148	+12	−4	−16	−2	+11	+18	−17	+95
1920	+105	+1, 151	+104	+61	+10	+76	+20	−10	+3	−70	+71	+41
1921	−78	0	−145	+99	−42	−52	−31	+3	−6	−21	−20	−20
1922	−101	+264	+184	+21	+18	+5	+38	+30	+44	+26	0	+68
1923	+73	+218	+19	+30	+36	−53	+3	+36	+21	−10	+20	+2
1924	−85	+38	0	−78	−26	+23	+2	−26	0	+15	−3	0
1925	+89	−38	−164	−47	−48	0	−25	0	−1	0	+43	+56
1926	0	−84	+79	+31	+74	+46	0	0	−2	+31	0	−6
1927	+64	−52	−113	0	0	−22	0	−1	+11	−16	+5	−65
1928	−57	−14	−40	+68	+200	+29	+49	+30	+3	−10	+10	−16
1929	+112	+161	−89	−97								
Median:												
1910–1916	404	382	355	337	171	110	81	67	100	121	158	263
1921–1927	283	242	342	237	127	88	45	39	42	92	100	161

TABLE A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
					30. New Orleans, La.							
1910	+74	+143	+67	+17	+82	+32	+14	−43	−14	−28	+113	+138
1911	0	−106	0	0	−13	−27	+6	+24	+41	+26	−37	−4
1912	−101	+42	−24	−55	−55	−38	+25	−21	−9	−40	−28	0
1913	−69	+12	−71	−44	+26	+22	0	+11	0	+5	+16	−28
1914	+10	0	+184	+62	0	0	−11	−27	+2	0	+13	+51
1915	+34	−48	+177	+74	+34	+42	−3	+4	+14	+24	0	+240
1916	−72	−164	−83	−67	−51	−32	−23	0	−10	−48	−58	−7
1917	+31	+69	−93	−18	−15	−24	−11	−77	−11	−5	−54	+8
1918	+122	+150	−120	+15	+38	−31	−6	−53	−22	+5,087	+747	+506
1919	+1,803	+258	−15	−67	−28	−13	−11	−1	−17	−66	−91	−32
1920	+53	+443	+266	+6	−34	−10	−39	−50	−34	−12	−73	+30
1921	−53	−145	−103	−61	−3	−8	−49	−7	−1	−8	−81	−57
1922	−79	−96	+92	−84	−19	0	−29	+13	−2	0	−67	0
1923	−44	+46	+44	+23	−14	−7	+13	−21	0	−28	+28	−31
1924	0	0	0	+37	+7	−1	−5	−30	−13	−32	−49	+22
1925	+2	+114	−18	+25	0	+21	+8	0	+10	+18	+16	−13
1926	+147	+367	+40	−1	+1	+11	+1	+19	+20	0	+63	+5
1927	+26	−90	−53	0	+38	+44	0	+15	+25	+23	0	+113
1928	+136	−76	+3	+58	+86	+34	−4	+46	−8	+22	+10	+479
1929	+618	−43	−61	−4								
Median:												
1910–1916	324	355	297	219	160	108	93	112	89	128	220	250
1921–1927	268	370	294	172	128	88	103	102	93	124	192	206
					31. New York City, N. Y.							
1910	+55	0	+3	+43	0	+5	+9	+7	+30	+29	+34	+111
1911	+52	+28	+22	+82	+14	−18	0	−3	+12	+21	+19	−12
1912	0	−10	−46	0	+18	0	−2	0	0	+36	+5	+2
1913	0	+63	+11	−11	+6	+7	0	+4	+7	−4	0	−36
1914	−16	+4	−10	−10	−7	−20	−21	−12	−6	−12	−9	−13
1915	−8	−58	0	+99	−4	+23	−9	−8	−2	0	−3	+83
1916	+153	−24	−75	−38	−20	−16	+3	+5	−4	−3	−15	0
1917	+171	+35	−89	−26	−11	−27	−39	−18	−2	+10	+19	−4
1918	+36	+1	+171	+107	−52	−62	−46	−33	+56	+3,213	+723	+233
1919	+652	+429	+180	+28	−58	−82	+5	−1	+1	−8	−21	+6
1920	+381	+795	+15	−5	−10	−3	−2	−2	−1	−9	−10	+4
1921	−6	0	−10	−34	−32	−10	−3	+1	0	0	−14	0
1922	+69	+218	+13	−11	+16	−8	−3	−4	−1	0	+16	+27
1923	0	+229	+65	−25	−21	−4	−3	0	−2	−6	−6	−4
1924	−4	−7	0	+10	+11	+22	+7	0	+8	+35	+34	+56
1925	+19	−11	−24	+20	0	+12	0	+6	+5	+18	+4	−2
1926	+11	+31	+273	+103	+14	+14	+8	0	+7	+12	0	+21
1927	−13	−34	−19	0	−6	0	+1	−5	−2	−11	−21	−18
1928	−12	−1	+53	+122	+149	+62	+15	+20	+14	+33	+10	+61
1929	+319	+117	+4	−32								
Median:												
1910–1916	273	301	341	261	226	157	117	101	97	126	178	256
1921–1927	198	222	223	195	145	84	58	57	62	85	122	143
					32. Oakland, Calif.*							
1910	+14	+6	0	−7	+1	+93	−5	+26	−3	0	−23	−73
1911	−1	0	−35	+43	+4	−5	0	0	−14	+18	+51	+3
1912	0	+15	+47	+23	0	+37	+69	−31	+28	+6	0	−11
1913	+81	+104	+20	+11	+16	−9	+10	+8	+10	+15	−32	+36
1914	−60	−65	−18	0	−14	+63	+7	+12	0	−22	+6	−71
1915	+25	−25	+35	+36	−24	0	−8	−35	−9	−44	+48	0
1916	−19	−12	−74	−19	−2	−21	−27	−6	+7	−64	−8	+31
1917	+11	+54	−5	+9	−17	−4	−17	−20	+23	−12	−24	−90
1918	−29	−3	+186	+112	−14	0	+17	−10	−4	+2,208	+1,568	+627
1919	+1,582	+36	+5	+65	+22	+4	+58	+26	+12	+12	−4	−6
1920	+183	+833	+131	−21	+20	+8	−9	−8	+27	+21	+44	+2
1921	−14	−23	−18	+14	+12	0	0	+1	−2	−2	−19	−17
1922	−43	+136	+90	0	+20	−33	+4	−21	+29	+17	0	+20
1923	−7	+144	−9	−43	−2	+1	−16	−7	−9	+29	+3	−23
1924	+48	0	+55	+10	+30	−16	+12	+28	+15	+8	+21	−20
1925	0	−56	+12	−8	−1	+12	−4	0	0	−3	−30	0
1926	+55	+27	0	−15	−34	−19	0	−5	−1	0	−12	+34
1927	+2	−16	−65	+1	0	+3	+39	+2	+21	−19	+4	+21
1928	−49	−4	+11	−1	−6	+6	+7	−16	+64	+58	+96	+91
1929	+41	−3	+16	−8								
Median:												
1910–1916	172	123	117	95	100	69	52	67	75	101	103	190
1921–1927	139	138	127	99	66	70	36	46	34	54	73	111

TABLE A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						33. Omaha, Nebr.						
1910	−24	−54	+29	+23	+81	+20	−14	+55	−15	0	+3	+17
1911	+230	+119	+75	+35	−46	+17	0	0	−39	−24	0	−133
1912	−10	−18	−57	−46	+50	0	−8	−1	+6	+27	+5	0
1913	0	0	−11	−27	−70	−32	−24	−10	−25	−5	−14	−107
1914	+9	−28	−51	0	0	−25	+4	+11	+18	−34	−24	−94
1915	−52	+97	0	−33	−10	−27	+16	+2	+30	+110	+37	+103
1916	+162	+147	+57	+97	+83	+35	+15	−12	0	+5	−15	+77
1917	+105	+235	+185	+98	+85	+55	+31	+6	+24	+59	+13	+51
1918	−91	+30	+33	+219	+31	−12	−15	−27	+9	+2,448	+1,199	+2,070
1919	+254	+39	+282	+235	−21	−6	+8	−24	+17	−3	0	−5
1920	+205	+806	+53	+50	+81	+65	+7	−12	+3	−35	−8	−29
1921	−1	0	−91	−5	0	−67	0	+11	+8	0	+15	0
1922	+89	+113	0	+10	+27	+12	+28	+15	+1	+51	0	+91
1923	+38	+318	+59	0	−21	−25	−2	−3	0	−27	+28	+29
1924	0	−22	−110	−43	+74	+21	−2	−27	+10	−17	−27	−31
1925	−4	+5	+48	+103	−24	−10	+41	+12	−3	+79	−12	+72
1926	+9	−35	+5	+53	+62	+35	+21	0	−9	+2	+54	−4
1927	−86	−20	−139	−46	−38	0	−15	−12	−4	−33	−4	−44
1928	−34	−56	−56	+51	+30	−12	+16	+3	−5	−44	+16	+511
1929	+72	+4	−34	−77								
Median:												
1910–1916	211	201	214	162	114	77	53	46	63	70	134	201
1921–1927	204	192	252	190	102	67	42	55	60	102	115	173
						34. Paterson, N. J.*						
1910	+30	−7	0	0	−35	−33	−23	+21	−9	0	+25	−7
1911	0	+1	−12	+74	−73	−17	−16	−17	−48	−19	−15	−93
1912	+62	0	+24	+54	0	+29	+29	−8	0	−11	+25	−29
1913	−33	+57	−16	−101	+25	+29	+28	+47	+27	−21	−17	+5
1914	−72	−56	+18	−92	−21	0	0	−27	+23	+33	+29	+12
1915	−2	−157	−137	+9	+5	+9	−18	+31	+7	+59	0	+55
1916	+253	+87	+183	−39	+48	−10	+35	0	−3	+22	+92	0
1917	+135	+67	−43	+14	+2	+71	−19	−23	−4	+30	+117	−64
1918	−53	+74	−9	+66	+1	−12	−46	+7	+85	+4,083	+1,093	+776
1919	+415	+793	+75	−17	−113	−48	+36	−34	+23	+13	−24	−53
1920	+123	+678	+65	+7	−29	+10	+1	−8	+1	−48	+20	−13
1921	+2	−21	+11	−13	+4	0	+18	+68	0	−23	−34	−15
1922	0	+392	+77	−49	−65	+25	−33	0	+17	−32	+115	+27
1923	+176	+125	0	+11	+19	−1	0	−1	+8	+19	0	0
1924	−120	+77	−26	+1	−99	+7	+17	−28	+13	+9	+43	+49
1925	+37	−35	−53	0	0	+32	−17	+15	−18	0	+7	+5
1926	−73	0	+292	+75	+15	−36	−9	−10	−10	−9	−11	−45
1927	−17	−47	−30	−70	−10	−28	+24	+6	−19	+15	−20	−54
1928	−132	−44	+34	+47	+87	+14	−23	+6	−2	−10	+13	−39
1929	+390	+31	−17	−72								
Median:												
1910–1916	316	266	290	242	157	75	72	63	86	103	130	241
1921–1927	246	201	186	172	133	62	42	43	44	83	96	169
						35. Philadelphia, Pa.						
1910	+46	+83	+30	−1	0	+23	+13	−6	0	−12	+61	−16
1911	−46	−1	+53	+38	+16	−12	+15	0	+16	+11	−5	+45
1912	0	−46	−67	−47	−32	−4	−4	+6	−8	0	−28	0
1913	−43	+42	−6	−39	−4	+1	+3	+6	+7	−1	−8	−22
1914	+19	+21	+82	+80	+7	0	0	0	0	+1	+21	−26
1915	−70	−78	−22	+142	−8	+1	−12	−15	−4	−12	0	+427
1916	+195	0	0	0	+16	−6	−8	+15	+26	+18	+31	+121
1917	+205	+150	+90	+68	+60	+33	+3	0	+1	+38	+66	+109
1918	+176	+122	+186	+119	+57	+26	+37	+3	+351	+7,499	+231	+99
1919	+390	+331	+120	+63	+18	−20	−5	−15	+14	−5	−41	−26
1920	+70	+900	+50	+41	+27	+5	+12	−8	0	0	−8	−1
1921	0	0	0	−33	−43	−11	−17	−13	−3	−17	−18	−32
1922	−25	+17	+49	−20	−23	−15	0	+3	−10	+2	+25	+96
1923	+194	+73	+45	+55	+12	−5	+1	−5	−6	−1	−31	−3
1924	−10	−113	−1	+69	+1	+6	+7	0	−7	0	0	+52
1925	+20	−79	−72	−12	0	+12	−4	+5	+11	+8	+16	+1
1926	+10	+68	+282	+60	+4	+1	+7	0	0	+10	+9	0
1927	−38	−148	−2	0	−52	0	−4	−22	0	−19	−32	−52
1928	−65	−142	+36	+53	+30	+16	+17	−10	−1	−15	−32	+169
1929	+236	−103	−46	−34								
Median:												
1910–1916	289	283	268	199	145	90	63	64	63	94	139	223
1921–1927	247	330	251	175	140	87	50	64	62	94	151	182

Table A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
					36. Pittsburgh, Pa.*							
1910	+54	+16	+338	+262	+140	+59	+13	+4	−11	0	0	0
1911	−3	−4	−92	−71	−16	−58	−15	−47	−21	−67	−91	−51
1912	−95	−6	0	0	−10	+21	+2	0	0	+52	+5	+126
1913	0	0	−90	−37	+190	+111	+37	+52	+100	+55	+27	−78
1914	+19	+75	+124	−16	−11	−25	−18	−37	−16	−38	−129	−104
1915	−146	−49	−21	+106	0	0	0	−29	+18	−42	−70	+176
1916	+629	+55	+11	+90	+71	−18	−11	+4	+43	+21	+81	+208
1917	+270	+167	+94	+76	+69	+59	+45	−4	+142	+61	+171	+238
1918	+300	+156	+154	+897	+115	+23	+56	−17	+52	+4,956	+3,786	+1,004
1919	+755	+838	+534	+103	+55	−18	+10	0	+3	−34	−95	+22
1920	+53	+1,777	−11	−1	+118	−9	+33	+15	+16	+49	−52	+6
1921	+8	0	−45	+18	+18	−2	−19	−7	−45	0	0	+40
1922	−31	+318	−158	−138	0	0	0	−2	0	+74	−9	+132
1923	+242	+651	+98	−29	+31	+28	+34	+36	+64	+74	+5	+14
1924	0	+66	+321	+124	+54	+23	+46	+21	+20	+37	+1	0
1925	+20	−10	+26	0	−26	+1	−8	+27	+9	−9	+8	−50
1926	−173	−192	0	+115	−4	−12	−12	−22	−39	−68	−119	−57
1927	−107	−215	−212	−146	−18	−31	+6	0	−4	−20	−106	−106
1928	−145	−218	−208	−69	+146	+9	+15	−15	−1	−55	−77	+810
1929	+697	−105	−187	−213								
Median:												
1910-1916	397	371	423	359	243	162	117	119	129	222	312	330
1921-1927	424	452	530	406	252	172	97	103	126	197	289	292
					37. Portland, Oreg.							
1910	0	−33	−16	+38	−13	+25	+21	+11	+13	+35	+9	0
1911	+30	+2	+65	+92	+29	0	+3	−12	−11	0	−27	−8
1912	−22	−56	−19	0	0	−6	−8	+26	0	+10	0	−32
1913	+12	+50	+17	−7	+40	+26	+1	−13	−1	+36	+15	+19
1914	−14	−11	−1	+50	+16	−14	−5	+7	+9	−3	−20	+15
1915	−20	+32	+18	−26	−52	+33	0	−14	+8	−9	−21	−2
1916	+81	0	0	−23	−48	−11	−12	0	−14	−10	+32	+36
1917	+39	−67	+32	+6	−20	−12	−8	−20	0	−11	+109	−76
1918	−77	+5	+128	+106	+124	+84	+1	−1	+29	+1,280	+1,749	+999
1919	+1,641	+95	+134	+98	+5	+11	−34	−19	+28	+15	+1	−9
1920	+104	+658	+78	−1	+7	+30	−12	−15	+3	+4	−3	−13
1921	−14	−69	−26	−16	−26	−31	−17	+6	−2	−24	+4	+11
1922	−3	+225	+247	0	+33	+9	0	−8	+6	−7	−2	+43
1923	+21	+17	+127	+64	+1	−23	+3	0	−3	+17	+23	−57
1924	−10	−68	+2	−37	0	+15	−19	0	+22	0	0	+26
1925	0	−57	0	+51	+27	+1	+5	+28	0	−10	−2	−18
1926	+51	0	−39	−23	−31	0	−12	+27	+16	+10	0	0
1927	+28	+90	−36	+9	−28	−26	+8	−2	−5	+29	+11	−25
1928	+46	−27	−69	−21	−29	+35	−17	+5	−6	+28	+2	+198
1929	+179	+22	+11	+26								
Median:												
1910–1916	147	114	73	73	87	51	41	34	34	44	73	124
1921–1927	119	166	140	102	96	67	52	42	34	63	104	129
					38. Providence, R. I.							
1910	+63	+35	+80	+45	+53	+30	+3	0	−46	0	+45	0
1911	−54	−7	0	0	+5	−3	−3	−5	−9	+10	+6	−48
1912	−34	−14	−17	−77	+14	+13	+13	0	+23	−6	0	−2
1913	0	0	−76	−100	−13	−9	+2	+41	+17	+24	−7	+6
1914	+19	+10	−58	+15	−39	−15	−4	+4	0	+18	−18	−46
1915	−55	−71	+88	+160	−4	0	0	−27	−21	−29	−3	+19
1916	+274	+60	+46	−14	0	0	−25	−1	+10	−24	+54	+8
1917	+199	+98	+3	+4	+109	+40	−26	−12	+25	+1	+21	−34
1918	−4	−59	+116	+183	+48	+3	+29	−2	+355	+4,259	+743	+835
1919	+849	+192	+98	−92	−18	−28	+15	−2	−1	−16	+5	+22
1920	+69	+1,267	+12	+90	+34	+17	+21	+17	−32	−37	+14	+10
1921	−1	−22	−125	−65	+16	0	−11	+16	+17	−19	+11	+20
1922	+41	+289	+25	−20	−10	−35	+12	0	+6	−35	+4	+68
1923	+54	+115	+118	0	−12	−3	+15	−14	0	0	−8	−33
1924	0	+58	−119	+20	0	+37	−4	+30	−10	−15	+4	0
1925	−70	0	0	+16	+50	+17	0	+3	−6	+18	−2	+37
1926	+38	−96	+142	+91	+29	+10	−5	−20	−12	+11	0	−19
1927	−60	−104	−140	−23	−11	−9	+3	−16	+1	+1	−41	−68
1928	−63	−80	−98	−51	+78	+33	+6	+4	0	+24	+14	−16
1929	+261	+159	−86	+4								
Median:												
1910–1916	309	336	339	318	157	105	86	52	79	105	145	215
1921–1927	211	234	312	179	108	74	35	37	47	96	93	153

TABLE A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	39. Richmond, Va.											
1910	+69	0	−30	−16	+67	+24	−8	+57	+43	+19	+58	+63
1911	−57	−36	−10	+26	0	−25	0	0	−15	−29	+17	−88
1912	−45	−51	+1	−53	−3	−35	−10	−37	−15	+67	+41	+59
1913	−51	+58	−76	−102	−32	+17	+7	+5	+2	−7	−26	0
1914	+36	−62	+97	0	0	−20	−3	+3	+27	0	−46	−14
1915	0	+51	0	+109	−28	0	+21	−53	0	−16	0	+129
1916	+39	+41	+10	+66	+51	+20	+64	−25	−23	+5	−40	−44
1917	+146	+46	−40	−88	+47	−18	+26	−54	+42	−40	+76	−56
1918	−87	+126	−31	−47	−34	−19	+46	−41	+77	+3,645	+653	+1,240
1919	+676	+119	+116	−8	−1	+37	+30	+33	+20	−12	+20	+46
1920	+141	+664	+66	−43	+50	+20	+83	+11	+5	+28	+10	+37
1921	−74	−91	−6	−45	+74	+32	−20	−10	−2	−28	+7	0
1922	−17	+22	+23	+14	−34	−11	+12	−18	+45	+37	+5	−10
1923	+64	+39	0	+65	+10	+1	+11	+14	−10	−3	−51	−12
1924	+15	−82	+22	+15	−49	0	+35	0	+9	+34	0	+38
1925	+10	0	−96	−34	0	−8	−23	−1	+15	0	−22	+72
1926	0	+588	+114	−55	−20	+11	−12	+29	−5	+68	+53	+6
1927	−84	−132	−45	0	+16	−16	0	+4	0	−33	−32	−2
1928	−98	−90	−35	−21	+8	+8	−25	+3	+6	+33	−52	+154
1929	+366	−58	−38	−42								
Median:												
1910–1916	354	325	361	272	153	99	45	90	61	119	160	277
1921–1927	268	343	241	184	107	86	74	64	44	88	159	168
	40. Rochester, N. Y.											
1910	+12	0	+81	0	−49	−26	−25	−22	−11	+38	+44	0
1911	0	−46	−43	−5	0	−39	+5	+9	+9	−28	+1	−20
1912	+41	+81	−68	+23	+1	+7	−6	+23	+2	+27	+14	+63
1913	+18	−5	+26	−23	+75	+70	+17	+41	0	+43	−32	+22
1914	−1	+72	+15	+64	+23	0	0	0	+12	−4	−7	−76
1915	−94	−37	0	+102	−19	−2	−1	−20	−13	−20	−48	−8
1916	−31	0	−93	−27	−41	+9	+29	−25	−10	0	0	+103
1917	+86	+70	−84	+47	+52	+6	+31	+5	+20	+20	−27	−26
1918	−45	+26	+41	+223	−34	−14	+8	+12	+22	+2,248	+967	+1,039
1919	+118	+49	+45	+101	+43	−60	+29	+4	+21	+26	+14	+11
1920	+143	+396	−10	+38	+48	−19	+5	−16	−21	−6	−36	−66
1921	−17	0	−60	−25	−17	−40	−4	−17	−10	−15	0	−28
1922	+31	+54	+112	+30	+21	0	0	−5	−14	0	+7	+10
1923	+90	+199	+35	0	−11	+3	−16	+13	−30	−8	−26	−34
1924	−21	−16	−68	−2	−27	−10	−5	+5	+1	+7	−15	−20
1925	−56	−59	−55	0	+51	−38	+10	+12	0	+47	+23	+2
1926	+9	+70	+362	+21	+38	+38	+9	−7	+15	−6	−5	0
1927	0	−13	0	−7	0	+14	+16	0	+3	+23	+2	+24
1928	+14	−9	−49	0	+50	+2	+1	−4	+2	+18	−3	−13
1929	+168	+91	−65	−28								
Median:												
1910–1916	224	196	241	161	162	93	52	43	66	85	144	161
1921–1927	123	117	189	134	87	76	31	44	46	50	77	110
	41. St. Louis, Mo *											
1910	−13	+88	+70	−5	+29	+20	−9	+3	−8	−1	+26	0
1911	+76	−23	−7	0	+10	−20	−1	+20	−1	−14	+49	−68
1912	−39	+83	0	+3	−36	0	0	+1	0	0	−32	+66
1913	0	−14	−28	−12	−15	+30	+14	0	0	+3	0	−105
1914	+3	+10	+16	+72	+3	+16	+12	−1	−2	−8	−22	−80
1915	−12	0	−31	+9	−50	−6	−11	−21	+7	+4	−59	+93
1916	+367	−6	+31	−4	0	−27	+23	−15	+23	+25	+12	+7
1917	+178	+133	+146	+136	+75	+26	+25	−19	+20	+44	+19	−12
1918	+30	+104	+105	+196	+55	+2	+21	+20	+16	+1,029	+1,276	+1,571
1919	+148	+132	+359	+50	−39	−11	−10	−46	−7	−33	−57	+41
1920	+467	+894	−60	+5	+51	−1	+5	+13	+10	−2	−49	−18
1921	−34	+3	−124	−90	−33	0	+11	+10	−7	−21	−27	−22
1922	+7	+167	+78	−53	−5	−1	−18	−19	−29	+6	−35	0
1923	+84	+176	0	0	+20	+13	−2	0	+28	+25	+35	−8
1924	−61	0	−86	+120	+8	+26	−4	+18	+14	0	0	+70
1925	+29	−14	+3	+18	−5	−6	0	+13	0	0	+75	+38
1926	0	−55	+86	+129	+35	−12	+29	−12	+6	+7	+31	+47
1927	−32	−116	−159	−77	0	+16	+1	−27	0	−14	−13	−52
1928	−75	+4	+66	+71	+61	+12	+20	+13	−15	−2	−26	+168
1929	+167	+27	−102									
Median:												
1910–1916	316	251	262	185	145	81	53	64	66	107	172	260
1921–1927	248	236	334	212	121	87	62	66	70	105	171	187

Table A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						42. St. Paul, Minn.						
1910	-31	-100	-12	-19	+45	+76	+45	+8	0	+3	+18	-25
1911	+71	+1	+9	-9	0	-15	+28	+2	-6	-9	-5	-53
1912	-6	-60	-25	+2	-33	-4	-5	-14	-7	-9	0	0
1913	+8	-8	0	0	-45	-16	0	-9	+9	+6	-6	-34
1914	-14	+8	+46	+102	+7	+44	0	+27	+25	0	+75	+2
1915	0	+59	+50	-2	-73	+59	+15	-5	+14	+41	+25	+179
1916	+20	0	-24	+2	+5	0	-11	0	-13	-6	-13	+36
1917	+130	+4	+20	-10	-27	-6	+24	-26	+8	+29	+13	+9
1918	-25	-77	+44	+191	+38	+30	+4	-11	-8	+837	+2,071	+1,050
1919	+236	+112	+180	+123	-44	-2	-13	-20	-45	+5	-53	+24
1920	+427	+698	+12	-36	+17	-11	+2	-10	-29	-56	-1	-57
1921	-60	+10	-4	-53	-39	+9	-3	0	+1	-17	-8	-83
1922	-41	-2	+146	-59	0	-17	-3	-6	+11	-27	-34	+49
1923	+31	+150	+115	-14	+9	-3	-4	+38	0	+2	+31	-30
1924	+5	-2	-18	0	-1	-28	+11	-1	-35	-42	0	-26
1925	-30	-31	0	+102	+17	+11	+29	-6	-10	0	-36	+6
1926	+2	0	-16	+41	+40	+6	+24	+46	+14	+38	+3	0
1927	0	+88	+7	+30	-13	0	0	+7	-1	+32	+12	+37
1928	+56	+110	+29	+48	+193	+126	+84	+49	+23	+116	+50	+298
1929	+248	+80	+41	+41								
Median:												
1910–1916	162	161	154	132	130	54	32	36	40	63	72	140
1921–1927	169	105	158	150	93	68	28	35	50	81	110	147
						43. San Francisco, Calif.						
1910	-10	-15	0	+17	+26	+12	+23	+41	-11	+4	-5	-90
1911	-4	0	-34	-63	-15	+49	+1	+12	+27	+18	+19	+62
1912	+25	+41	+12	0	-20	-43	-36	-4	-6	-30	+22	-11
1913	+48	+41	+23	+11	+15	0	-21	0	0	+10	-6	-16
1914	-21	-20	+7	0	0	-7	-10	-9	+3	-44	-19	+19
1915	0	-14	-53	-8	+5	+9	+2	+38	+38	0	0	0
1916	+20	+13	-10	+10	-6	-8	0	-1	-23	-27	+26	+9
1917	-5	+32	-42	-13	+16	-20	-9	+4	+18	-17	+26	-45
1918	-33	+28	+77	+118	+16	+36	-13	-16	-7	+3,061	+1,722	+941
1919	+1,758	+64	0	+126	+53	+34	+12	-8	-34	+4	-11	-7
1920	+183	+850	+127	-19	+10	-6	+8	-9	-18	-11	-20	-18
1921	-16	-47	0	+12	-7	-19	0	-12	-12	-21	-10	+5
1922	-46	+340	+110	0	+7	+8	+6	0	-9	0	+4	-18
1923	+2	+123	+65	-35	-1	0	-11	-10	-5	-19	0	+70
1924	+29	0	-14	+6	0	+3	+8	-26	+3	+32	+1	+28
1925	0	-32	+22	+23	+7	-3	-6	+18	+10	+19	+12	0
1926	+105	+4	-4	-18	+14	-1	-1	+2	0	-9	-20	-8
1927	-37	-33	-2	-3	-4	+10	+4	+13	+2	+4	-5	-2
1928	-115	-113	-66	-86	-32	-39	-21	-33	-32	+49	+19	+12
1929	-73	-86	-92	-56								
Median:												
1910–1916	210	149	169	131	106	90	87	71	98	114	115	208
1921–1927	186	182	143	119	82	68	61	69	82	78	106	131
						44. Scranton, Pa.*						
1910	+33	-64	+20	+41	+38	-42	-60	-8	-8	+47	0	-28
1911	-41	-6	0	-8	0	+41	-24	0	-8	-8	+36	-20
1912	-114	+118	+88	0	-73	+31	-6	-27	0	0	-123	+24
1913	0	0	-76	-76	-65	-7	+82	+17	+146	-1	+50	+22
1914	-99	+67	+11	+77	+101	+92	+36	-2	+44	+34	+12	+55
1915	+75	-3	-62	+157	-6	-9	+35	+6	+43	-29	-144	-8
1916	+162	+127	-80	-62	+2	0	0	+6	-48	+15	-36	0
1917	+97	+147	+39	+70	0	-46	+34	-12	-12	+39	-65	-28
1918	+34	+173	+62	+389	+76	+51	-10	-21	-4	+1,823	+2,313	+1,230
1919	+304	+180	+25	+92	-3	-56	+44	+2	+40	-41	-11	+111
1920	+54	+1,323	+40	-16	-29	+10	+44	+28	-22	+61	-12	+104
1921	0	-40	-73	+25	+3	0	+1	+10	+12	0	+13	0
1922	+32	+163	+153	-20	-40	-18	0	-33	-15	+33	-40	+210
1923	+14	+96	0	-30	-41	-79	0	-8	-32	-18	-41	-27
1924	-163	+18	-26	+64	0	+50	0	0	+97	+57	+30	+140
1925	+18	0	+29	+121	+65	+23	+16	+8	+35	+22	+18	+137
1926	-148	-121	+101	0	+80	+56	+73	-17	-33	-61	0	-37
1927	-59	-113	-146	-129	-36	-29	-2	+7	0	-37	-35	-14
1928	-158	-120	+8	+22	+4	-38	+47	+39	+25	-37	-36	-6
1929	+172	-61	-35	-156								
Median:												
1910–1916	311	285	369	315	243	145	105	99	120	143	262	236
1921–1927	313	312	310	281	200	114	67	75	93	127	162	169

TABLE A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	45. Seattle, Wash.*											
1910	−25	0	−33	+6	+27	+38	+30	+30	+43	+41	+27	+2
1911	0	+44	+22	−47	+4	−8	0	0	0	−5	−36	−73
1912	+6	−63	0	−1	−2	0	−6	−1	−6	+21	−22	−56
1913	−38	+26	+19	+38	+22	+27	−11	+11	+21	+1	−19	0
1914	−14	−2	−24	+3	−6	−15	+1	+6	+6	0	+2	−21
1915	+50	+24	+3	0	0	−3	−8	−16	−4	−6	0	+23
1916	+5	−10	−53	−58	−22	+9	+4	−17	−9	−3	+6	+44
1917	−30	−9	−42	−5	−27	+12	+7	−13	−2	0	+8	−24
1918	−17	+14	+22	+153	+53	+31	+37	+18	+29	+1,454	+912	+1,328
1919	+726	+238	+42	+162	+88	+22	−6	+42	+14	+12	+69	+39
1920	+50	+839	+135	+75	+18	+24	+1	+4	−10	−20	−7	−5
1921	+11	−77	−30	0	+23	−7	0	−15	0	−10	−12	0
1922	−2	+182	+24	+20	0	0	−15	−12	−1	0	−10	−6
1923	0	0	0	+21	+2	−1	+8	+8	−19	+26	+14	−45
1924	+2	−64	+1	−9	−17	−2	−6	0	+8	−3	−19	+21
1925	−4	−71	−57	+36	+38	+14	−11	−24	−13	−27	+6	−15
1926	+49	+31	+28	−46	−32	+10	+2	+8	+3	+1	+11	+29
1927	−1	+7	−31	−1	−1	+42	+23	+7	+15	+22	0	+17
1928	+41	−26	−5	−35	−21	+12	+12	−12	+8	−20	+34	+292
1929	+144	+38	−8	−17	−1							
Median:												
1910–1916	114	93	102	96	67	33	29	29	39	48	70	110
1921–1927	79	125	113	89	67	33	40	37	37	60	68	96
	46. Spokane, Wash.*											
1910	0	+38	−11	+11	+12	+47	+34	+45	+70	+12	0	+56
1911	+214	+63	0	+116	+23	0	+34	+34	+11	0	+47	+11
1912	−12	−16	+46	0	−11	−35	−34	−34	−24	−22	−46	−79
1913	+56	+50	+12	+46	−22	−11	−11	0	−24	0	−58	−68
1914	−23	−50	−67	−35	0	0	0	−11	0	+11	+58	−45
1915	−23	0	0	−24	−33	−11	−22	−11	0	+11	+58	0
1916	+56	−28	−101	−35	+23	+24	+23	+11	−35	−56	−23	+46
1917	+124	+50	−67	+58	−45	−23	+11	−24	−35	+11	−35	+46
1918	+78	+25	−11	+69	+12	+35	−34	0	0	+816	+1,992	+1,646
1919	+665	+188	+463	+58	−45	+24	+22	−9	0	−96	+46	−31
1920	+114	+1,416	+55	−27	+30	+86	+22	−9	−23	−40	−23	−56
1921	+90	−78	−47	−63	+18	+27	−23	+36	+82	+73	0	0
1922	+113	+171	+77	+19	+97	+4	−23	−20	0	−40	−70	−45
1923	−11	−53	+32	−39	−50	−54	0	−32	−46	+5	−35	−45
1924	0	−119	−92	−4	+18	−31	0	−13	0	−6	−35	−56
1925	−5	0	0	+67	−10	+23	+8	0	−24	+86	+16	+25
1926	−5	+96	+54	0	−75	0	−57	0	−13	0	+83	+58
1927	+178	+168	−65	0	0	0	+8	−21	+20	−54	+39	+47
1928	+81	−29	−10	+22	−86	+23	+29	+22	+20	+32	+39	+643
1929	+178	+120	+86	−90	−32							
Median:												
1910–1916	102	137	180	82	101	58	45	34	47	90	128	158
1921–1927	135	203	216	179	140	89	68	43	58	119	140	159
	47. Syracuse, N. Y.											
1910	0	+148	+41	0	−1	−31	+3	+20	−7	+34	−4	+13
1911	−64	0	−57	−74	−22	−36	−7	−15	0	+5	+53	0
1912	−51	−82	−77	+66	+49	+13	0	0	+32	+52	+32	−11
1913	+143	+156	+23	+83	+27	+43	+14	+14	+13	0	+20	+8
1914	+57	+2	−37	+36	0	0	+44	−11	+3	−18	0	−89
1915	−116	−71	+49	−1	−42	−18	−19	−34	−38	−35	−11	+68
1916	+89	−64	0	−36	0	+49	−27	+39	0	−22	−6	−40
1917	−27	−6	+110	+12	+11	+9	−6	+8	+13	−16	−24	+58
1918	−3	−26	+132	+285	+36	−16	+14	−7	+209	+4,374	+303	+117
1919	+152	+161	+62	−4	−10	−39	+2	−17	−5	−1	+5	−18
1920	+277	+1,173	+58	+83	+92	+12	+1	+10	+9	−37	−10	+8
1921	−39	−21	0	−60	+1	−73	0	+9	−13	−51	−53	−28
1922	0	0	−61	+29	0	−5	−13	−5	0	+15	+8	−9
1923	+150	+173	+49	0	−61	+1	0	+21	0	0	0	+23
1924	−9	+26	−51	+46	+44	+14	−27	−5	+19	0	+47	+8
1925	−37	+31	+90	+17	+9	0	−1	+7	−8	+31	+25	0
1926	+18	−1	+257	−32	−12	−9	+43	0	+11	−16	−4	−21
1927	+92	−51	−68	−20	−18	+17	+2	−8	+1	−15	−59	+14
1928	−58	−101	−46	+119	+93	+28	+37	+21	+18	+19	+82	+126
1929	+351	+37	+87	+31								
Median:												
1910–1916	222	230	215	212	155	96	57	57	60	103	136	166
1921–1927	153	177	188	150	120	94	40	38	55	105	102	129

Table A.—*Excess monthly death rates (annual basis) per 100,000 from influenza and pneumonia in each of 50 cities in the United States, 1910–1929*—Continued

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
						48. Toledo, Ohio						
1910	−3	−15	+17	+31	+133	+32	−17	0	+19	+23	−51	+16
1911	+78	−7	−5	−4	−10	+13	−12	−22	+50	+16	0	−37
1912	−27	−47	0	+4	0	−10	0	+3	0	−46	+9	+29
1913	+18	+21	−39	−73	+2	0	−33	−43	−9	−29	−68	−52
1914	0	0	−9	+53	−44	−23	+3	+4	−29	−32	−27	−44
1915	−63	+58	+88	−37	−34	−12	+12	−21	−24	+24	+10	+78
1916	+185	+70	+43	0	+75	+29	+14	+15	+29	0	+7	0
1917	+132	+134	+134	+59	+74	+14	−19	−8	+5	−19	−69	−58
1918	+2	+29	+18	+199	−12	−62	−20	−15	−8	+1,421	+829	+916
1919	+184	+83	+498	+224	+15	−12	−19	−7	−12	−47	+14	−20
1920	+74	+767	+36	+23	+25	−25	−20	−12	+7	+19	+7	−81
1921	−64	−21	−91	−20	−62	−3	−11	+6	−4	−16	0	−22
1922	+1	−24	+155	−4	0	0	+24	−22	+5	+10	−25	+20
1923	+25	+238	+70	−31	−7	−11	0	+8	−1	+21	0	−7
1924	−33	0	−53	0	+32	+34	+7	−7	−7	−28	+11	0
1925	−74	+28	0	+51	−17	−6	+14	−3	0	+57	−4	+17
1926	+14	−38	+35	+50	+80	+41	−3	0	+20	−10	+15	+21
1927	0	+27	−30	+12	+1	+6	0	+3	+2	0	+20	−35
1928	−34	+57	−71	+60	+78	+43	+6	+39	+5	+2	+49	+463
1929	+196	+71	−23	+9								
Median:												
1910–1916	155	184	205	162	103	83	45	55	60	97	144	156
1921–1927	189	144	184	135	99	70	39	36	42	62	72	143
						49. Washington, D. C.						
1910	+133	+118	+102	−17	+24	+32	−16	+14	+23	−25	+46	+23
1911	+55	+90	+9	+40	+13	+3	+10	−19	−3	+66	+8	0
1912	0	0	−23	−16	0	−23	−11	−13	−8	+28	0	+4
1913	−60	−53	−92	−20	−17	+4	+6	−2	−4	−23	−11	−6
1914	−19	−56	0	+23	−23	−27	+1	0	+1	0	−23	−106
1915	−80	+129	+167	+78	−1	−17	0	+11	0	−5	−7	+106
1916	+143	−5	−29	0	+14	0	−5	+27	+26	+20	+2	−40
1917	+106	+79	−50	−75	+36	−30	−21	−13	−18	+34	−6	+25
1918	+180	+113	+147	+77	+58	−20	+9	−3	+157	+4,306	+355	+974
1919	+829	+121	+25	−85	−23	−27	+15	+1	+15	−9	−17	+78
1920	+573	+651	+1	−5	−16	+11	+13	−6	+19	0	−6	+42
1921	−53	−34	−15	−55	0	0	+6	+19	+6	−2	−28	+21
1922	+11	−5	0	0	−18	−41	−5	−6	−16	−39	+46	+55
1923	+215	+343	+183	+60	+46	+40	+31	+20	+39	+16	+22	−6
1924	−53	+3	+18	+13	+7	+2	+5	−10	+13	0	+7	+18
1925	−111	−81	−30	+1	−14	−29	−2	+1	0	+7	0	0
1926	+28	+221	+39	−24	+33	+5	−1	0	−2	−14	−17	−14
1927	0	0	0	−43	−51	−49	0	−2	−7	+9	−17	−28
1928	−47	−49	+2	+23	+18	−10	−3	+14	+10	+7	−12	+53
1929	+251	+22	−43	−46								
Median:												
1910–1916	256	277	340	229	110	92	58	53	60	78	151	209
1921–1927	212	246	220	165	112	83	48	54	50	85	116	137
						50. Worcester, Mass.						
1910	−4	−132	−3	+4	0	+39	+53	−4	+54	+52	+45	+6
1911	−34	−40	−18	−20	−13	−30	+60	−5	+35	−14	0	−86
1912	+22	+53	0	−73	+37	0	+35	+9	+9	−15	−35	+65
1913	+36	+106	+30	−32	−29	+35	−13	0	0	−10	−53	−85
1914	0	0	−79	0	+4	−14	−14	+6	−40	+39	−56	0
1915	−100	−38	+103	+16	−30	−47	0	+33	−11	0	+2	+124
1916	+361	+160	+60	+40	+23	+3	−23	−25	−4	+62	+43	−38
1917	+23	+74	+32	+11	+108	−65	−10	+16	+15	+10	−47	−62
1918	−45	+14	+25	+234	+7	−31	+9	−20	+955	+4,312	+299	+608
1919	+698	+233	+92	−69	−44	−40	+21	−30	+16	−30	+1	+91
1920	+13	+834	+268	+95	+11	+52	+14	+55	+48	+28	−49	+3
1921	−62	+15	+10	+31	−23	+44	−19	+15	+1	0	+23	0
1922	0	+215	−31	−44	+59	−23	0	+21	0	−28	−25	+81
1923	+35	+261	+36	0	−25	+3	−7	+33	+32	+36	0	−3
1924	−42	−46	−47	−27	−26	−11	+17	−6	−1	−15	+5	−73
1925	−119	−83	0	+35	+41	−12	+17	0	−1	+40	+4	+62
1926	+2	−31	+143	+390	+32	0	−2	0	+11	+26	−36	+16
1927	+11	0	−35	−58	0	+37	+3	−1	−2	−42	−56	−22
1928	−134	−21	+35	+176	+77	+67	−21	−31	+16	0	−1	−29
1929	0	+74	+2	−60	−49	−20						
Median:												
1910–1916	301	202	292	295	209	143	65	60	70	100	154	235
1921–1927	242	213	228	182	126	69	45	43	46	90	143	154

TABLE B.—*Excess[1] weekly death rates (annual basis) per 100,000 from*

EPIDEMIC

Week ending—	(1) Albany*	(2) Atlanta	(3) Baltimore	(4) Birmingham	(5) Boston	(7) Buffalo	(8) Cambridge*	(9) Chicago	(10) Cincinnati	(11) Cleveland	(12) Columbus	(13) Dayton*
1918												
Sept. 14	[2]+37	[2]+117	[2]−28	−16	+208	[2]+13	[2]+247	−53	[2]+2	[2]−24	[2]−28	[2]+24
21	-------	[2]+2	[2]−49	−19	+1,745	[2]+51	[2]+94	−50	[2]−19	[2]−5	[2]+38	[2]−14
28	[2]+31	[2]+20	[2]+62	+65	+5,341	[2]+89	+4,921	+77	[2]−1	[2]+2	[2]+81	[2]+14
Oct. 5	[2]+29	+89	+872	+392	+8,436	+422	+6,587	+720	+148	+51	[2]+167	[2]+109
12	+2,056	+698	+4,590	+1,744	+7,111	+1,809	+5,381	+1,967	+778	+194	+570	+1,018
19	+5,059	+2,058	+11,217	+3,216	+4,013	+5,506	+2,883	+4,063	+2,405	+991	+1,588	+4,653
26	+8,609	[2]+2,578	+8,830	+3,897	+1,445	+7,544	+864	+4,573	+3,553	+3,001	+2,584	+4,744
Nov. 2	+7,148	[2]+1,891	+3,162	+2,428	+810	+4,683	+759	+2,774	+3,104	+4,557	+2,052	+3,052
9	+2,320	[2]+656	+1,056	+1,229	+375	+1,645	+80	+1,301	+1,979	+3,467	+1,040	+2,238
16	+808	[2]+528	+235	+1,213	+163	+706	+261	+592	+1,103	+2,273	+709	+595
23	[3]+42	[2]+428	+218	+1,138	+194	+201	+249	+300	+1,199	+1,500	+846	[2]+22
30	+493	[2]+679	+107	+1,962	+178	+199	+147	+218	+1,053	+1,192	+1,294	+301
Dec 7	+144	[2]+718	+239	+2,501	+223	+119	+83	+295	+1,764	+1,144	+2,039	+404
14	+308	[2]+1,107	+301	-------	+345	+468	+450	+591	+2,529	+1,364	+1,680	+1,001
21	+278	[2]+558	+326	+3,644	+673	+442	+579	+731	+1,929	+1,434	+1,127	+1,273
28	+351	[2]+589	+159	+1,329	+1,143	+505	+997	+596	+867	+1,090	+259	+545
1919												
Jan. 4	+273	[2]+790	+2	+764	+1,416	+286	+1,601	+323	+429	+697	+116	+193
11	+250	[2]+794	+175	+982	+1,289	+483	+784	+189	−13	+448	+96	+175
18	+53	[2]+1,165	+224	+1,201	+806	+723	+686	+295	−27	+437	+9	+236
25	+189	[2]+1,239	+707	+863	+772	+1,064	+496	+321	+70	+438	+234	+64
Feb. 1	+513	[2]+1,153	+632	+497	+472	+720	[3]−25	+199	+27	+514	+213	+138
8	+377	[2]+458	+558	+251	+327	+562	+219	+42	+232	+490	+35	+37
15	+426	[2]+272	+498	+451	+202	+142	−109	+126	+336	+354	+121	+147
22	+150	[2]+349	+296	+361	+206	+125	+33	+125	+738	+357	+227	+154
Mar. 1	+243	[2]−25	+127	[2]−78	+187	+221	−165	+120	+896	+427	+373	+333
8	+197	[2]−20	+8	[2]−74	+175	−34	−80	+89	+1,119	+663	+364	+237
15	+243	[2]−119	+69	[2]−37	+5	−8	−89	+129	+1,044	+661	+1,094	-------
22	+939	[2]−124	−83	[2]−166	−8	−44	+99	+111	+1,037	+671	+851	+384
29	+253	[2]−165	−124	−110	−40	−28	−134	+78	+517	+433	+371	+230
Apr. 5	+585	[2]−95	−143	[2]−43	−71	+34	−29	+31	+286	+255	+434	+488
12	+136	[2]−179	−98	+45	−3	+106	[2]−17	−28	+86	+368	+261	+209
19	+247	[2]−179	−145	[2]+115	−59	−16	[2]−193	−41	+60	+382	+83	+208
26	+267	[2]−129	−32	+142	−60	−36	+12	−112	−1	+108	+44	+48
May 3	+288	[2]−139	−81	[2]+191	+37	[2]−73	[2]−66	−83	+4	+121	−39	−5
10	+263	[2]−16	−17	[2]+4	−50	[2]−4	[2]−48	−75	[2]−94	+117	+119	+22
17	−87	[2]−179	−152	[2]−13	−57	[2]−38	[2]+21	−118	[2]−63	+7	+54	+23
24	+119	[2]+115	[2]−62	[2]+89	−90	[2]−60	[2]−102	−59	[2]−74	+28	−3	−19
31	−45	[2]−71	[2]−18	[2]+33	−37	[2]−7	[2]−3	−68	[2]−39	−51	+16	-------

*Cities marked with asterisk (*) are not included in the group of 35 cities because continuous weekly data from 1918 to 1930 were not available.

[1] Excess over the estimated median rate for corresponding weeks for the period 1910–1916. The monthly median rates (annual basis) for each city were plotted and a smooth line passing through each of the 12 monthly medians was drawn to represent the seasonal curve of mortality from influenza and pneumonia. From this graph the approximate medians for each week were read.

[2] Pneumonia only.

[3] Influenza only.

Leaders indicate no data available; 0 means no excess over median rate.

influenza and pneumonia in certain large cities in the United States

OF 1918-19

(14) Denver	(15) Detroit	(16) Fall River	(17) Grand Rapids	(18) Indianapolis	(19) Jersey City*	(20) Kansas City, Mo.	(21) Los Angeles	(22) Louisville	(23) Lowell*	(24) Memphis	(25) Milwaukee*
[2]+1	−11	0	[2]+00	[2]−8	[2]−62	[2]+28	[2]+30	[2]+23	[2]−16	....	[2]−3
[2]−9	−18	+279	....	[2]+39	[2]+7	....	[2]−12	[2]+151	+675	....	[2]+5
[2]+85	+15	+759	[2]+7	[2]+103	[2]+271	[2]+104	[2]−41	[2]+29	+1,414	....	[2]+94
[2]+305	+13	+4,106	[2]+74	[2]+338	+1,066	+549	[2]+77	[2]+239	+4,252	....	[2]+111
+1,129	+244	+8,622	[2]+218	+710	+3,993	+1,527	[2]+608	+1,965	+6,483	+2,753	+735
+2,788	+993	+8,232	+336	+2,113	....	+2,723	+1,205	+3,913	+5,308	+6,334	+1,238
+2,950	+2,186	+4,108	+790	+1,881	+7,424	+3,129	+2,762	+3,919	+3,806	+5,745	+1,949
+2,132	+2,734	+1,631	+630	+1,339	....	+3,184	+3,613	+1,406	+1,277	+2,368	+1,352
+1,984	+1,626	+926	+434	+883	....	+2,185	+2,903	+1,146	+243	+1,372	+989
+1,480	+791	+481	+1,054	+699	....	+1,203	+2,803	+710	+233	+419	+689
+2,116	+403	+285	+780	+830	....	+925	+1,779	+613	+362	+431	+437
+2,600	+464	+135	+622	+1,577	....	+1,467	+1,482	+1,210	−76	[2]−10	+889
+3,666	+293	+539	+1,086	+1,087	....	+2,807	+1,064	+1,049	+276	+325	[2]+1,083
+4,004	+616	−13	+1,897	+975	[2]+69	+3,962	+1,136	+1,848	+253	+693	+1,978
+3,195	+891	+342	+1,382	+569	....	+2,660	+1,193	+1,039	+129	+734	+1,786
+1,572	+730	+494	+783	+632	[2]+203	+1,171	+953	+630	[2]+242	+531	+1,066
+1,094	+675	+131	+557	+350	[2]+241	+564	+731	+281	+312	+356	+578
+710	+634	+463	+161	+438	[2]+270	+565	+1,207	+225	[2]+157	+794	[2]+145
+455	+709	+369	+152	+181	[2]+355	+852	+1,455	+237	+614	+793	[2]+48
+228	+593	+268	+226	+232	[2]+233	+477	+1,448	+433	+891	+1,286	[2]+33
+331	+530	+386	0	+186	[2]+200	+689	+778	+208	+205	+705	[2]−50
+354	+356	+372	−68	+160	[2]+81	+397	+261	+182	[2]+38	+1,761	[2]+53
+503	+304	+271	+15	+248	....	+578	+33	+178	+564	+342	[2]−64
+345	+398	+340	−62	+332	....	+498	−71	+567	−96	+374	[2]−13
+310	+486	+145	−30	....	....	+649	−2	+483	+308	+195	[2]−38
+316	+234	+92	+8	+334	[2]+151	+525	−44	+1,668	+112	−20	[2]+21
+528	+360	+174	+113	....	....	+468	+14	+2,194	−76	+150	[2]+115
+455	+251	+146	+91	....	[2]+436	+739	+77	+1,637	+73	+500	+285
+302	+89	+108	+111	+589	[2]+286	+505	+102	+712	−49	+260	+235
+272	+19	−236	+93	+346	[2]+143	+386	+86	+90	+28	+102	+333
+141	+71	−112	+67	[2]+167	[2]+76	+540	+106	+92	[2]+48	+191	+498
+130	+16	+218	−25	+40	[2]−44	+338	+134	−86	[2]−40	−26	+307
+30	+42	−74	+102	+90	[2]+92	+127	−23	−34	+64	−72	+202
+4	−36	[2]−144	+148	+34	....	+194	+43	−4	−61	−84	+429
+81	−8	[2]−130	−1	−22	[2]+6	−15	+19	+21	−45	+48	+89
−49	−11	[2]−120	+2	−47	[2]−3	+7	−43	−47	−76	+13	+48
+23	−29	−149	+4	+32	[2]−44	+40	−10	+122	0	−20	+11
−8	+9	[2]−181	−30	−22	[2]+8	+67	−39	+64	[2]−83	+175	−19

TABLE B.—*Excess*[1] *weekly death rates* (*annual basis*) *per 100,000 from*

EPIDEMIC

Week ending—	(26) Minneapolis	(27) Nashville	(28) Newark	(29) New Haven	(30) New Orleans	(31) New York	(32) Oakland *	(33) Omaha	(35) Philadelphia	(36) Pittsburgh *	(37) Portland, Oreg.
1918											
Sept. 14	[2]−18	[2]+23	--------	0	[2]−22	[2]−24	+99	[2]−32	[2]−3	[2]−15	[2]+48
21	--------	--------	+13	[2]−33	--------	+6	0	--------	[2]+30	[2]+18	0
28	[2]+103	[2]+48	+33	+391	[2]−54	+83	[2]−30	[2]−12	[2]+154	+153	[2]+27
Oct. 5	[2]+127	[2]+128	+604	+1,078	+296	+592	[2]−6	[2]+127	+1,991	+445	[2]+25
12	+618	+5,650	+2,344	+2,426	+1,865	+1,904	[2]+372	+1,835	+7,628	+829	[2]+125
19	+1,335	+8,494	+5,001	+4,892	+8,441	+3,896	+977	+4,411	+13,362	+3,280	+805
26	+2,046	+5,531	+5,442	+5,908	+9,218	+4,830	+3,404	+4,040	+8,741	+4,940	+1,898
Nov. 2	+1,608	+2,253	+4,722	+5,404	+4,398	+4,039	+5,908	+2,546	+3,408	+5,404	+3,195
9	+1,244	+2,181	+2,145	+2,55[illegible]	+1,971	+2,008	+3,879	+1,889	+974	+6,897	+3,168
16	+1,202	+459	+1,282	+1,426	+828	+832	+1,670	+1,217	+344	+4,483	+1,731
23	+603	+478	+739	+490	+284	+440	+848	+913	+150	+152	+1,679
30	+515	+767	+542	+605	+359	+202	+176	+1,148	+103	+2,357	+691
Dec. 7	+850	+883	+537	+847	+339	+205	+245	+2,391	+110	+1,480	+1,383
14	+872	+960	+805	+754	+690	+218	+301	+4,144	+97	+1,493	+1,271
21	+1,217	+992	+723	+1,437	+694	+262	+648	+2,[illegible]	+159	+963	+1,303
28	+805	+664	+656	+860	+503	+393	+824	+1,[illegible]	+121	+796	+820
1919											
Jan. 4	+325	+550	+652	+919	+9[illegible]0	+447	+1,432	+473	+143	+518	+982
11	+415	+403	+565	+832	+1,607	+553	+2,074	+173	+279	+535	+1,912
18	+110	+566	+446	+469	+2,414	+667	+2,549	+257	+371	+598	+2,357
25	+215	+552	+400	+438	+2,389	+845	+1,479	+263	+454	+899	+2,341
Feb. 1	+201	+362	+374	+250	+1,349	+801	+780	+101	+597	+818	+881
8	+208	+263	+332	−1	+435	+552	+301	+130	+467	+918	+176
15	−11	+302	+184	−28	+310	+444	[2]+69	+74	+352	+1,087	+84
22	+289	+611	+362	−183	+243	+438	[2]−45	+127	+382	+851	+137
Mar. 1	+70	+441	+452	+51	+60	+498	−16	+39	+314	+820	+49
8	+249	+413	+220	+27	+30	+381	[2]−13	+228	+247	+633	+80
15	+327	+122	+287	−1	+91	+326	[3]−11	+335	+198	+638	+108
22	+192	+632	+245	−28	−47	+185	−34	+448	+177	+598	+294
29	+233	+214	+240	−121	+1	+167	−32	+349	+111	+548	+113
Apr. 5	+75	+237	+76	−215	−46	+134	+19	+360	+43	+264	+155
12	+208	+128	−9	−148	−96	+72	[2]+46	+401	+117	+346	+94
19	+54	+150	+82	−174	--------	+72	+218	+499	+79	+258	[2]+29
26	+74	−15	[3]−178	−217	--------	+3	+48	[2]−9	+84	+92	+149
May 3	+40	+171	[3]−146	−143	--------	−18	+49	--------	+10	+214	+125
10	+9	[2]−130	[3]−140	−74	--------	0	+51	--------	[2]+23	+83	+60
17	+8	+195	[3]−135	+112	--------	−39	+78	--------	[2]+11	+54	−25
24	+20	+151	0	−67	--------	−58	[2]−40	--------	[2]−2	+112	+37
31	[2]+17	+63	--------	+6	+1	−63	[2]−32	--------	0	+27	+24

* Cities marked with asterisk (*) are not included in the group of 35 cities because continuous weekly data from 1918 to 1930 were not available.

[1] Excess over the estimated median rate for corresponding weeks for the period 1910-1916. The monthly median rates (annual basis) for each city were plotted and a smooth line passing through each of the 12 monthly medians was drawn to represent the seasonal curve of mortality from influenza and pneumonia. From this graph the approximate medians for each week were read.

[2] Pneumonia only.

[3] Influenza only.

Leaders indicate no data available; 0 means no excess over median rate.

influenza and pneumonia in certain large cities in the United States—Continued

OF 1918-19

(38) Providence	(39) Richmond	(40) Rochester	(41) St. Louis *	(42) St. Paul	(43) San Francisco	(45) Seattle *	(46) Spokane *	(47) Syracuse	(48) Toledo	(49) Washington, D. C.	(50) Worcester
[2]+13	+60	[2]-43	[2]+17	[2]+28	[2]-30	[2]+31	[2]+50	0	[2]-15	[2]+62	[2]+140
[2]+138	+27	[2]-50	[2]+19	------	[2]+48	[2]-6	------	------	------	[2]+46	+436
[2]+400	+51	[2]+55	[2]+60	[2]+19	[2]+51	[2]+27	[2]-9	+1,112	[2]+43	+353	+2,939
+2,102	+1,191	[2]+27	[2]+87	[2]-29	[2]+46	[2]+53	[2]-19	+4,273	[2]-6	+2,070	+5,861
+4,026	+3,973	+583	+493	+1,316	[2]+86	+1,242	+121	+6,776	+123	+5,964	+6,778
+5,549	+6,011	+1,821	+1,169	+1,628	+1,260	+1,808	+858	+7,837	+1,010	+7,618	+4,678
+4,721	+3,853	+3,908	+1,477	+1,221	+5,726	+2,696	[3]+1,896	+4,287	+2,991	+4,722	+2,552
+2,877	+2,070	+3,822	+1,627	+2,232	+7,695	+1,814	+839	+2,021	+2,459	+2,131	+1,643
+1,315	+723	+1,831	+1,419	+2,389	+4,266	+1,397	+3,427	+756	+1,793	+551	+1,031
+660	+555	+844	+1,399	+2,971	+1,979	+1,117	+2,171	+587	+885	+369	+238
+580	+225	+615	+1,123	+1,905	+828	+506	+1,363	+76	+796	+290	+696
+344	+544	+556	+1,416	+1,462	+449	+718	+1,555	+69	+478	+339	+410
+573	+642	+780	+2,362	+1,421	+351	+1,220	+2,546	+94	+653	+313	+123
+669	+1,488	+1,078	+2,988	+1,338	+550	+1,901	+3,937	+128	+942	+857	+45
+786	+1,306	+1,484	+1,757	+1,302	+1,236	+1,653	+1,040	+175	+1,727	+1,267	+774
+1,188	+1,250	+1,202	+605	+775	+1,663	+1,223	+1,047	+73	+1,033	+1,652	+696
+770	+1,207	+850	+155	+714	+1,793	+803	+361	+60	+259	+1,436	+896
+1,003	+453	+243	+253	+397	+2,792	+1,055	+683	+207	+172	+1,062	+763
+1,055	+686	+77	+195	+148	+3,005	+839	+747	-77	+258	+1,028	+989
+1,022	+564	+150	+173	+106	+1,347	+843	+794	+220	+275	+609	+344
+440	+358	-2	+211	+176	+433	+344	+735	+333	+158	+445	+376
+327	0	+80	+83	+137	+268	+567	+226	+82	-44	+222	+320
+280	-50	+86	+181	+95	+57	+256	+222	+77	+57	+189	+382
-96	-50	+110	+192	+118	+37	+108	+207	+199	+267	+31	+150
+123	-24	-101	+304	+183	+65	+108	+145	+355	+109	+95	-56
+452	+238	+100	+379	+156	+66	+239	+731	+267	+299	+117	+295
+146	-54	+25	+548	+109	+9	+34	[3]+371	+56	+405	+56	+177
-70	-23	+105	+519	+177	-33	-18	+520	-67	+450	-40	+88
0	-16	+33	+276	+272	-7	+66	+678	-68	+761	+15	+57
-17	-121	+10	+138	+350	+126	+34	[3]+47	-42	+554	-117	[2]-32
[2]-164	-65	+52	+183	+226	+209	+18	-12	-107	+457	-132	-60
+8	-96	+18	+79	+115	+189	+70	+117	-46	[2]+339	-70	-154
-50	-34	+142	+77	[2]+26	+176	+327	+67	-128	+220	-82	[2]-138
-20	-97	+178	+1	+71	+129	+215	+14	+10	+80	-110	-89
+38	-159	+106	[2]-23	-63	+42	+138	-43	-124	+3	-85	+50
-40	0	+24	[2]-27	-41	+36	+130	[2]+51	+19	+64	-51	[2]+43
-46	-48	+46	[2]-15	+32	+114	+72	-50	-58	-14	+9	+121
+34	+92	+26	-1	[2]-68	+97	+97	------	-15	+36	-10	-84

TABLE C.—*Excess*[1] *weekly death rates (annual basis) per 100,000 from*

Week ending—	(1) Albany*	(2) Atlanta	(3) Baltimore	(4) Birmingham	(5) Boston	(6) Bridgeport*	(7) Buffalo	(8) Cambridge*	(9) Chicago	(10) Cincinnati	(11) Cleveland	(12) Columbus
												EPIDEMIC
1919												
Dec. 6	+30	[2]+92	−50	+239	−102	-------	+36	−87	+1	−84	+19	−19
13	+66	[2]−50	−11	−65	−30	-------	−34	−97	+42	−42	−17	+43
20	+56	[2]−33	+2	+13	0	-------	−49	+36	+59	0	+13	+16
27	+93	[2]−124	−44	−48	−34	-------	+21	−70	+51	+16	[2]−52	−83
1920												
Jan. 3	+83	[2]−138	−53	+1	−38	-------	−7	+15	+49	+23	+31	−48
10	−63	[2]−132	−144	[2]−1	−18	-------	−41	+191	+60	−33	−20	+166
17	−113	[2]+58	−58	[2]−87	−24	-------	−78	+132	+140	−64	−2	+34
24	−78	[2]+68	−148	+140	+90	-------	+44	+169	+745	−4	−2	+14
31	+421	+55	+87	+81	+365	-------	+18	+444	+1,955	+94	+84	+340
Feb. 7	+643	+484	+523	+308	+870	-------	+527	+823	+1,751	+248	+832	+1,123
14	+1,094	[2]+1,406	+1,547	+191	+1,540	-------	+1,279	+1,103	+764	+564	+1,469	+2,405
21	+816	[2]+1,947	+1,279	+1,367	+1,267	-------	+1,317	+871	+274	+803	+937	+1,275
28	+673	[2]+1,361	+515	+1,679	+707	-------	+835	+399	+62	+1,037	+596	+884
Mar. 6	+213	-------	+214	+1,851	+315	-------	+404	−25	+24	+695	+243	+253
13	+170	[2]+356	+113	+960	+93	-------	+218	+27	−1	+189	+153	+141
20	−98	[2]+117	−95	+552	+17	-------	+74	+83	+21	+230	+125	+36
27	+100	[2]+157	−61	[2]−139	+105	-------	+82	+184	−38	+97	+64	+79
Apr. 3	-------	[2]+18	−87	[2]−225	−55	-------	+80	+47	−38	−84	+68	+57
												EPIDEMIC
1928												
Nov. 3	+106	−41	−38	−21	−9	+2	−13	−12	+16	+14	−3	−60
10	+12	−65	−50	−4	−50	+137	+38	−105	−21	+64	+3	+17
17	+4	−108	+1	−100	+7	+94	+50	−32	−5	+16	−47	−28
24	+167	−123	+29	−120	+11	+122	+7	−37	+20	+39	−28	−33
Dec. 1	+200	+4	+1	−41	−31	−33	+25	−45	+27	+36	−33	−38
8	+277	+117	+44	−33	−9	+71	+20	−94	+47	−12	−22	−25
15	+51	+229	+57	+4	−8	−11	+107	−21	+153	+29	−22	−48
22	+257	+933	−8	−123	+62	−58	+233	−72	+305	+31	+169	+243
29	+421	+1,328	+181	+107	+13	+114	+239	+83	+413	+235	+442	+685
1929												
Jan. 5	+499	+727	+336	+1,719	+75	+174	+394	+114	+315	+1,148	+730	+1,008
12	+664	+551	+592	+3,237	+250	+345	+671	+101	+198	+992	+818	+1,127
19	+961	+358	+471	+1,717	+407	+917	+506	+461	+118	+786	+542	+568
26	+1,167	+185	+359	+732	+565	+1,165	+477	+575	+31	+451	+103	+223
Feb. 2	+1,076	−106	+97	+309	+601	+689	+360	+813	+1	+147	+67	+101
9	+421	+110	+114	−91	+398	+363	+170	+359	−36	+29	−7	+31
16	+328	+5	+58	+141	+238	+110	+186	−13	−9	+99	+78	+101
23	−108	−55	+13	−166	+87	+213	+63	+111	−25	+109	+1	+153
Mar. 2	+190	+93	+99	+179	+199	−43	+13	−53	−5	+55	−30	+101
9	+230	+62	−18	−31	+59	−7	+11	−8	−42	+113	−50	−3
16	−72	+136	−32	−31	+20	+172	+26	+245	−54	+37	−55	+14
23	+60	−134	−78	+11	+27	−76	+44	−78	−57	+39	−86	−55
30	+67	−97	−115	−36	−7	+71	+61	+53	−88	−77	−4	−3
Apr. 6	+82	−82	−42	−130	−150	−108	+96	+306	−43	−13	−72	−73

* Cities marked with asterisk (*) are not included in the group of 35 cities because continuous weekly data from 1918 to 1930 were not available.

[1] Excess over the estimated median rate for corresponding weeks for the period 1921–1927. The monthly median rates (annual basis) for each city were plotted and a smooth line drawn to pass through all of the 12 monthly medians except the very irregular points. From this line representing the seasonal curve of mortality from influenza and pneumonia the approximate medians for each week were read.

[2] Pneumonia only.

[3] Influenza only.

Leaders indicate no data available; 0 means no excess over median rate.

influenza and pneumonia in certain large cities in the United States

(13) Dayton*	(14) Denver	(15) Detroit*	(16) Fall River	(17) Grand Rapids	(18) Indianapolis	(19) Jersey City*	(20) Kansas City, Mo.	(21) Los Angeles	(22) Louisville	(23) Lowell*	(24) Memphis	(25) Milwaukee*
OF 1920												
−85	−9	−32	−63	+25	−21	−62	−14	+2	+95	+28	+60	+12
+78	−96	+45	−30	−19	+25	+157	+60	−24	−2	+21	+148	[4]−36
+33	−67	+35	+46	+53	+37	[2]−119	-------	+13	−74	−77	−8	+130
−110	+23	+50	−50	−29	+43	+149	+10	−90	+52	+54	−29	+53
+89	+7	+141	−65	+3	[4]−131	+14	−9	+8	+19	−47	+149	+40
−13	+113	+76	+98	−74	+105	+37	−6	−18	+30	+41	+33	+148
+86	[2]+45	+118	+213	+33	[2]+62	+27	+236	−10	+17	−9	+8	[2]+5
+286	+159	+277	−14	−45	+134	+198	+1,290	−7	−17	−104	−54	+361
+1,398	+653	+2,428	−105	+100	+370	+889	+1,656	+10	+169	+124	−111	+1,443
+1,429	+2,8[illegible]0	+2,733	−29	+1,037	+1,279	-------	+3,234	+179	+644	+348	+252	+1,926
+920	+2,875	+2,272	+437	+1,258	+1,790	-------	+2,382	+585	+897	+254	+1,577	+1,207
+645	+1,005	+734	+816	+1,067	+926	+1,122	+890	+4[illegible]6	+807	+1,450	+1,483	+297
+66	+547	+303	+547	+384	+543	+406	+544	+325	+405	+1,127	+1,012	+176
−6	+93	+191	+49[illegible]	+236	+412	+247	+153	+234	+185	+1,033	+900	−1
+23	−18	+165	+32[illegible]	+38	+71	+155	+50	+22	+144	+526	+341	−27
+124	+2	+34	+289	−37	+125	+75	+225	+43	+21	+113	+147	+14
+28	+83	+42	−85	+43	+170	−39	−3	+25	+53	+23	+50	-------
+206	+47	+93	−67	−27	+85	+41	[2]−4	+26	−48	−16	+80	-------
OF 1928-29												
−16	−23	−21	−67	+35	−20	−11	+21	+96	+43	+56	−66	+3
−22	−33	−13	−112	−33	−70	−35	−63	+72	−30	−42	−81	+17
+169	−64	+17	−87	−7	+15	+56	−87	+73	+26	−47	+17	−47
−39	−8	−28	−19	+82	+118	+62	−78	+259	−61	−10	+26	−68
−80	+267	+29	−143	+10	+42	−44	+60	+625	−34	−62	−126	−24
+106	+649	+24	+5	+100	+145	+10	+199	+794	+71	−70	+266	−7
−45	+1,667	+7	−122	+411	+370	+64	+683	+720	0	+11	−79	−38
+114	+1,107	+148	+23	+660	+638	+164	+782	+396	−5	+50	+68	+194
+278	+546	+507	+285	+718	+682	+119	+94	+281	+67	−90	+321	+319
+304	+324	+778	+115	+175	+664	+222	+225	+196	+420	+35	+1,502	+472
+500	+203	+60[illegible]	+415	+363	+395	+354	+94	+122	+550	−14	+1,454	+620
+414	+19[illegible]	+219	+400	+41	+113	+616	+121	+33	+884	+334	+637	+307
+44	−60	+6	+815	+102	+185	+501	−36	+48	+636	+507	+743	+196
−70	−105	+69	+539	+65	+39	+400	+56	+31	+244	+328	+35	+77
+11	+27	−76	+452	−64	+70	+298	+112	+43	+216	+498	+15	+102
+347	+110	+60	−23	−69	+97	+122	−31	−57	−2	+188	−82	+67
−52	−9	+50	+45	+23	−10	+69	−19	+46	+27	−34	−162	−81
−1	+32	−8	−81	+16	+175	+34	+48	+76	+261	−34	−154	+54
−6	+6	+36	−125	−115	+40	0	−122	+1	+105	+8	−194	−39
−95	+16	+30	−164	−55	−12	+43	+31	+75	−18	+95	−15	−51
−67	−35	−35	−157	−118	−7	−46	−62	+211	+8	−78	−258	+49
−62	−68	−6	−181	−50	−50	−6	−26	+127	−93	−76	−92	−28
+4	−114	+22	−163	+113	−104	+4	−37	+32	−130	−68	−116	+16

TABLE C.—*Excess*[1] *weekly death rates (annual basis) per 100,000 from influ*

Week ending—	(26) Minneapolis	(27) Nashville	(28) Newark	(29) New Haven	(30) New Orleans	(31) New York	(32) Oakland*	(33) Omaha	(34) Paterson*	(35) Philadelphia	(36) Pittsburgh*
											EPIDEMIC
1919											
Dec. 6	−46	+158	−16	+49	−53	−12	+49	−45	....	−6	+31
13	+72	+187	+25	+39	+7	−11	−58	−33	....	−33	−54
20	+25	+42	−36	+89	−73	−6	−42	−15	....	+7	−63
27	+8	−103	−46	+11	+38	−4	+2	+144	....	−81	−34
1920											
Jan. 3	+138	−114	+17	+155	−4	+2	+36	−60	....	−38	+115
10	+27	−37	+37	−14	+96	+13	−40	−90	....	−79	+28
17	−2	+173	−3	+39	+81	+42	+50	−13	....	−37	+63
24	−18	−60	+194	+88	+61	+265	+332	+145	....	+36	+65
31	+714	+192	+504	+364	+113	+993	+427	+1,003	....	+149	+235
Feb. 7	+2,132	+1	+1,262	+386	+152	+1,615	+1,166	+1,459	....	+520	+1,035
14	+1,549	+645	+1,583	+1,647	+495	+1,431	+1,142	+1,483	....	+1,397	+3,217
21	+570	+1,681	+970	+1,889	+856	+684	+1,288	+646	....	+1,459	+2,083
28	+24	+2,325	+484	+700	[3]+165	+247	+365	+535	....	+768	+1,216
Mar. 6	−47	+1,036	+234	+436	[3]+46	+115	+274	+289	....	+341	+431
13	+84	+722	+109	+240	+489	+67	+326	[2]+72	....	+179	+184
20	−70	+291	+209	+179	+434	+39	+22	[2]+152	....	+33	−31
27	+35	+274	+65	+60	+111	+23	+75	[2]−87	....	+24	+21
Apr. 3	−48	+231	−5	+48	+222	+41	+80	[2]+110	....	+30	+35
											EPIDEMIC
1928											
Nov. 3	+6	+18	0	+71	+44	0	+68	−58	−18	−44	−135
10	+10	+117	−29	−22	+32	+18	+63	+6	+84	−29	−96
17	+96	−46	−4	+23	+34	+5	+96	+45	+3	−9	−49
24	−59	−61	−2	−42	−24	+17	+89	−11	−43	−24	−10
Dec. 1	−19	+1	−32	−52	+62	+12	+328	+23	−22	−14	−32
8	+79	+207	+24	−90	+40	+22	+73	+78	−4	+42	−146
15	−8	+192	−19	+67	+129	+38	+64	+624	−54	+70	+118
22	+272	+105	+4	+24	+492	+48	+131	+707	+35	+226	+887
29	+406	+167	+82	−42	+942	+64	+126	+771	−123	+251	+1,906
1929											
Jan. 5	+415	+306	+313	+27	+1,523	+130	+174	+249	+471	+442	+2,184
12	+469	+1,339	+681	+99	+752	+300	+93	−58	+715	+406	+1,087
19	+147	+994	+459	+145	+301	+423	+107	+148	+602	+284	+467
26	+122	+794	+435	+296	+88	+472	−105	+28	+462	+179	+35
Feb. 2	+8	−74	+246	+92	+60	+321	+28	+47	+287	−8	−41
9	−17	+22	+57	+276	−88	+198	−45	+138	+185	−81	+8
16	−31	−253	+21	+266	−20	+136	+12	−5	+10	−89	−176
23	+92	+64	−102	+31	+162	+20	−60	−54	+267	−91	−205
Mar. 2	−49	+272	+74	−36	−112	+48	+76	+107	+58	−15	−117
9	−41	−115	+8	−18	+36	+39	+98	+10	−44	−56	−78
16	−35	−48	+41	−23	+3	+1	+84	−15	−6	−26	−140
23	−51	−151	−80	−76	−190	−5	+32	+55	+69	−38	−143
30	−111	−236	−31	−41	−44	−21	−58	+11	+73	−46	−195
Apr. 6	−124	−5	−37	−132	+34	+7	+23	−26	−31	−62	−226

* Cities marked with asterisk (*) are not included in the group of 35 cities because continuous weekly data from 1918 to 1930 were not available.

[1] Excess over the estimated median rate for corresponding weeks for the period 1921–1927. The monthly median rates (annual basis) for each city were plotted and a smooth line drawn to pass through all of the 12 monthly medians except the very irregular points. From this line representing the seasonal curve of mortality from influenza and pneumonia the approximate medians for each week were read.

[2] Pneumonia only.

[3] Influenza only.

Leaders indicate no data available; 0 means no excess over median rate.

enza and pneumonia in certain large cities in the United States—Continued

OF 1920

(37) Portland, Oreg.	(38) Providence	(39) Richmond	(40) Rochester	(41) St. Louis*	(42) St. Paul	(43) San Francisco	(45) Seattle*	(46) Spokane*	(47) Syracuse	(48) Toledo	(49) Washington, D. C.	(50) Worcester
−57	−89	−83	+46	−2	+24	−16	+1	0	+1	−55	+19	+160
−20	−11	−34	+20	−12	−118	−16	+63	−53	−4	+14	+81	+111
+56	+62	−172	−21	+21	+34	−26	+27	+95	−74	+22	+118	−6
+94	+72	−159	−44	+27	+6	+4	+22	−57	+44	−95	−16	−17
−55	−49	−59	+20	+95	0	+37	+51	--------	+35	+4	+172	−59
+122	+73	−195	+104	+154	−67	−36	−67	+35	+120	+18	+34	+71
+20	+81	−4	−3	+38	-------	+80	−39	−20	+83	−6	−83	+34
+35	−40	−109	+78	+247	+420	+305	+8	−28	+140	+12	+713	−32
+192	+81	+328	+265	+1,332	[3]+995	+417	+88	+414	+765	+200	+1,887	+169
+267	+618	+740	+732	+2,430	+1,615	+990	+416	+1,406	+2,501	+961	+1,685	+198
+988	+1,681	+830	+762	+1,622	+1,239	+1,217	+1,504	+2,995	+2,166	+877	+838	+1,032
+886	+1,758	+539	+318	+587	+420	+982	+1,173	+1,440	+690	+877	+407	+1,2[illegible]2
+671	+982	+102	+173	+116	+155	+745	+860	+639	+505	+370	+118	+747
+416	+537	+29	+46	−60	−44	+396	+447	+289	+140	+137	+41	+1,467
+258	+53	−44	+97	−77	+66	+184	+133	+139	−10	+97	+14	+2[illegible]2
+162	+80	−54	−23	−72	+90	+95	+22	−55	+203	−69	+49	+125
+55	−33	−160	−3	−60	+136	+171	+77	+50	+150	+4	+143	+250
−15	+123	−147	−28	−79	−39	+74	+117	+93	−20	+80	−91	+61

OF 1928-29

(37) Portland, Oreg.	(38) Providence	(39) Richmond	(40) Rochester	(41) St. Louis*	(42) St. Paul	(43) San Francisco	(45) Seattle*	(46) Spokane*	(47) Syracuse	(48) Toledo	(49) Washington, D. C.	(50) Worcester
−15	−59	−40	−16	−49	+91	+57	+44	+13	−16	+79	+51	−86
−40	−27	−130	−36	−96	−17	+107	+1	−87	+109	−25	−51	−20
+20	+56	−89	+52	−39	−5	+67	−29	−45	+104	−2	+17	−135
+34	−60	+8	+13	−30	+9	+85	+34	+46	+99	+76	+3	−40
+8	+40	−31	+21	−34	−1	+116	+69	+44	+68	+61	−55	−100
−30	−6	−41	−50	−44	−29	+67	+120	+327	+113	+96	+3	−83
+230	−34	0	+6	+20	+148	+110	+238	+800	−22	+327	+12	−170
+207	−13	+385	−15	+6	+329	+73	+290	+798	+22	+579	+47	−182
+380	+30	+262	+43	+226	+531	+79	+421	+558	+278	+936	+60	−140
+393	+20	+589	+54	+277	+608	+64	+282	+364	+534	+400	+77	−45
+267	+82	+868	+83	+299	+443	−37	+226	+216	+789	+393	+359	−5
+54	+342	+420	+97	+192	+196	+64	+153	+164	+339	+190	+368	−93
+66	+457	+58	+376	+76	+72	−34	+41	−130	+127	+71	+269	−154
+63	+447	+16	+292	+56	−11	−78	+134	+6	+70	+86	+209	−75
−47	+292	−208	+224	−45	+134	−41	+50	−49	+39	+86	+151	−75
+111	+100	−74	+45	+24	+93	+24	+34	+86	+8	+86	−38	−153
+127	+17	+203	+21	−33	+72	−63	+48	+173	+81	−14	−61	−153
+8	+98	+4	+16	+27	+93	−30	+61	+28	−28	−14	+1	−46
+137	+18	+51	−20	−111	+72	−48	+129	+124	+71	+86	+43	−44
+16	−3	−95	+9	−10	−31	−62	−6	−19	+149	−39	−4	−41
+56	−107	−75	−52	+1	+95	+78	−42	−62	+74	+8	−50	−141
−55	−107	−60	−65	−97	+54	−28	−64	−9	+81	−99	−123	−183
+96	+64	−73	−102	−14	+36	−23	−44	+45	+195	−37	−110	−40

TABLE D.—*Populations of the 50 cities considered in this study*

City	Enumerated population according to the census of—		Estimated population as of July 1, 1928
	Apr. 15, 1910	Jan. 1, 1920	
1. Albany*	100, 253	113, 344	120, 400
2. Atlanta	154, 839	200, 616	255, 100
3. Baltimore	558, 485	733, 826	830, 400
4. Birmingham	132, 685	178, 806	222, 400
5. Boston	670, 585	748, 060	799, 200
6. Bridgeport*	102, 054	143, 555	179, 834
7. Buffalo	423, 715	506, 775	555, 800
8. Cambridge*	104, 839	109, 694	125, 800
9. Chicago	2, 185, 283	2, 701, 705	3, 157, 400
10. Cincinnati	353, 591	401, 247	413, 700
11. Cleveland	560, 663	769, 841	1, 010, 300
12. Columbus	181, 511	237, 031	299, 000
13. Dayton*	116, 577	152, 559	184, 500
14. Denver	213, 381	256, 491	294, 236
15. Detroit*	465, 766	993, 678	1, 378, 900
16. Fall River	119, 295	120, 485	134, 300
17. Grand Rapids	112, 571	137, 634	164, 200
18. Indianapolis	233, 650	314, 194	382, 100
19. Jersey City*	267, 779	298, 103	324, 653
20. Kansas City, Mo	248, 381	324, 410	390, 976
21. Los Angeles	319, 198	576, 673	792, 870
22. Louisville	223, 928	234, 891	329, 400
23. Lowell*	106, 294	112, 759	118, 419
24. Memphis	131, 105	162, 351	190, 200
25. Milwaukee*	373, 857	457, 147	544, 200
26. Minneapolis	301, 408	380, 582	455, 900
27. Nashville	110, 364	118, 342	139, 600
28. Newark	347, 469	414, 524	473, 600
29. New Haven	133, 605	162, 537	187, 868
30. New Orleans	339, 075	387, 219	429, 370
31. New York	4, 766, 883	5, 620, 048	6, 017, 500
32. Oakland*	150, 174	216, 261	274, 123
33. Omaha	124, 096	191, 601	222, 800
34. Paterson*	125, 600	135, 875	144, 900
35. Philadelphia	1, 549, 008	1, 823, 779	2, 064, 341
36. Pittsburgh*	533, 905	588, 343	673, 800
37. Portland, Oreg	207, 214	258, 288	299, 907
38. Providence	224, 326	237, 595	286, 300
39. Richmond	127, 628	171, 667	194, 400
40. Rochester	218, 149	295, 750	328, 200
41. St. Louis*	687, 029	772, 897	848, 078
42. St. Paul	214, 744	234, 698	252, 169
43. San Francisco	416, 912	506, 676	585, 269
44. Scranton*	129, 867	137, 783	144, 700
45. Seattle*	237, 194	315, 312	383, 200
46. Spokane*	104, 402	104, 437	109, 100
47. Syracuse	137, 249	171, 717	199, 300
48. Toledo	168, 497	243, 164	313, 200
49. Washington, D. C	331, 069	437, 571	552, 000
50. Worcester	145, 986	179, 754	197, 600

* Cities marked with an asterisk (*) are not included in the group of 35 cities, because continuous weekly data from 1918 to 1930 were not available.

DEATHS DURING WEEK ENDED SEPTEMBER 6, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended September 6, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Sept. 6, 1930	Corresponding week, 1929
Policies in force	75, 680, 042	74, 659, 729
Number of death claims	10, 059	10, 366
Death claims per 1,000 policies in force, annual rate	6. 9	7. 2

Deaths [1] from all causes in certain large cities of the United States during the week ended September 6, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Sept. 6, 1930				Corresponding week, 1929		Death rate [2] for first 36 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (77 cities)	6, 779	10. 3	625	[4] 50	11. 0	802	12. 2	13. 1
Akron	50	10. 3	5	46	6. 6	5	8. 0	9. 6
Albany [5]	38	15. 5	3	62	16. 5	6	15. 3	16. 5
Atlanta	69	13. 4	9	92	12. 5	4	16. 3	16. 2
White	32		4	63		3		
Colored	37	(6)	5	144	(6)	1	(6)	(6)
Baltimore [5]	196	12. 7	24	83	11. 4	20	14. 3	15. 2
White	146		12	53		13		
Colored	50	(6)	12	192	(6)	7	(6)	(6)
Birmingham	91	18. 3	11	106	13. 0	7	14. 2	16. 8
White	48		5	79		2		
Colored	43	(6)	6	147	(6)	5	(6)	(6)
Boston	179	11. 9	16	46	12. 8	29	14. 3	15. 7
Bridgeport	34	12. 0	6	103	9. 6	4	11. 3	12. 6
Buffalo	154	14. 0	16	71	13. 3	23	13. 3	14. 5
Cambridge	17	7. 8	1	20	8. 3	2	11. 9	13. 0
Camden	28	12. 5	4	70	11. 1	1	14. 1	14. 8
Canton	14	6. 9	1	27	5. 5	3	10. 3	11. 7
Chicago [5]	579	8. 9	45	40	9. 3	49	10. 6	11. 6
Cincinnati	123	14. 2	12	71	17. 4	12	15. 8	17. 6
Cleveland	171	9. 9	13	39	12. 2	22	11. 4	13. 0
Columbus	58	10. 4	11	108	14. 6	3	16. 1	15. 3
Dallas	48	9. 5	5		9. 7	5	11. 9	12. 0
White	35		3			5		
Colored	13	(6)	2		(6)	0	(6)	(6)
Dayton	38	9. 8	4	60	10. 3	5	10. 6	11. 7
Denver	73	13. 2	12	131	14. 4	19	14. 8	15. 2
Des Moines	25	9. 1	0	0	8. 5	2	12. 1	11. 8
Detroit	211	7. 0	25	38	10. 0	62	9. 6	11. 6
Duluth	17	8. 8	3	81	10. 8	3	11. 3	11. 8
El Paso	33	16. 8	9		12. 4	4	18. 1	20. 6
Erie	19	8. 5	2	44	6. 8	0	11. 5	12. 8
Fall River [5, 7]	15	6. 8	1	23	6. 8	1	12. 3	14. 6
Flint	25	8. 3	4	47	8. 9	8	9. 4	10. 8
Fort Worth	26	8. 4	0		12. 1	5	11. 3	13. 0
White	22		0			3		
Colored	4	(6)	0		(6)	2	(6)	(6)
Grand Rapids	28	8. 6	4	60	7. 8	2	10. 5	10. 3
Houston	51	9. 1	6		10. 4	6	12. 4	13. 0
White	31		6			5		
Colored	20	(6)	0		(6)	1	(6)	(6)
Indianapolis	97	13. 8	9	68	16. 3	17	15. 0	15. 1
White	80		9	78		12		
Colored	17	(6)	0	0	(6)	5	(6)	(6)
Jersey City	60	9. 9	7	61	8. 6	9	11. 6	12. 9
Kansas City, Kans.	34	14. 5	4	93	7. 3	0	11. 6	13. 8
White	26		4	110		0		
Colored	8	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo.	92	12. 2	8	67	11. 4	6	13. 7	14. 4

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended September 6, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929—Continued

City	Week ended Sept. 6, 1930				Corresponding week, 1929		Death rate [2] for first 36 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Knoxville	8	3.9	1	23	9.5	1	14.0	13.9
White	7		1	26		0		
Colored	1	(6)	0	0	(6)	1	(6)	(6)
Los Angeles	191	8.0	10	29	12.9	27	11.2	11.6
Louisville	57	9.7	3	26	10.5	6	13.9	15.4
White	45		3	30		4		
Colored	12	(6)	0	0	(6)	2	(6)	(6)
Lowell [7]	20	10.4	4	106	10.8	3	13.8	14.7
Lynn	13	6.6	1	28	8.7	0	10.7	11.6
Memphis	59	12.2	5	59	23.5	7	17.8	19.6
White	31		2	36		4		
Colored	28	(6)	3	101	(6)	3	(6)	(6)
Milwaukee	101	9.2	14	61	9.2	17	9.9	11.3
Minneapolis	92	10.3	6	39	9.0	9	10.8	11.2
Nashville	38	13.5	6	94	17.4	5	17.7	19.6
White	17		5	105		4		
Colored	21	(6)	1	62	(6)	1	(6)	(6)
New Bedford [7]	14	6.5	2	51	6.4	1	11.1	13.0
New Haven	27	8.7	1	15	10.9	2	13.2	13.7
New Orleans	135	15.4	6	33	15.0	15	17.9	18.0
White	80		4	34		7		
Colored	55	(6)	2	32	(6)	8	(6)	(6)
New York	1,227	9.2	96	40	9.9	146	11.1	11.7
Bronx Borough	186	7.6	6	17	7.5	21	8.1	8.5
Brooklyn Borough	386	7.7	33	35	8.4	56	10.0	10.6
Manahttan Borough	475	13.4	41	53	13.9	52	16.6	17.0
Queens Borough	125	6.0	13	52	7.9	9	7.2	7.9
Richmond Borough	55	18.1	3	58	17.2	5	14.8	16.3
Newark, N. J.	88	10.3	5	26	11.3	8	12.3	13.3
Oakland	51	9.3	2	25	10.5	2	11.1	11.6
Oklahoma City	36	10.1	4	72	8.9	2	10.8	10.9
Omaha	46	11.2	4	49	10.3	4	13.9	14.1
Paterson	37	13.9	5	87	14.3	7	12.6	13.7
Philadelphia	401	10.6	45	67	11.2	48	12.8	13.5
Pittsburgh	134	10.4	16	57	11.9	23	14.0	15.2
Portland, Oreg.	50	8.7	2	25	10.9	4	12.5	13.1
Providence	49	10.2	5	46	10.0	1	13.4	15.0
Richmond	47	13.4	6	87	13.5	5	15.3	16.8
White	29		2	44		3		
Colored	18	(6)	4	171	(6)	2	(6)	(6)
Rochester	74	11.8	7	62	10.7	5	11.9	12.9
St. Louis	183	11.6	12	42	10.3	13	14.6	15.2
St. Paul	51	9.8	2	20	8.2	2	10.3	10.8
Salt Lake City [5]	26	9.6	5	79	8.3	4	12.7	13.2
San Antonio	53	10.8	9		10.3	12	15.8	15.1
San Diego	43	15.0	3	63	11.6	1	14.6	15.6
San Francisco	177	14.7	8	51	11.9	7	13.3	13.4
Schenectady	20	10.9	0	0	11.5	1	11.5	12.8
Seattle	64	9.2	3	30	9.6	2	11.1	11.3
Somerville	12	6.0	3	95	8.6	3	10.0	9.5
Spokane	29	13.1	1	26	13.6	0	12.4	13.1
Springfield, Mass.	22	7.6	1	17	10.5	1	12.4	13.1
Syracuse	40	10.0	3	37	16.3	6	12.0	13.7
Tacoma	19	9.3	1	27	11.8	0	12.8	11.9
Toledo	59	10.5	5	46	12.5	9	12.8	13.9
Trenton	35	14.9	4	77	14.1	2	17.1	17.5
Utica	22	11.2	3	83	11.2	3	15.0	15.8
Washington, D. C.	131	14.0	13	76	13.7	24	15.5	15.8
White	81		7	61		9		
Colored	50	(6)	6	107	(6)	15	(6)	(6)
Waterbury	13	6.7	2	49	8.3	3	10.0	9.8
Wilmington, Del. [7]	26	12.9	4	96	13.9	8	14.8	14.2
Worcester	42	11.1	4	55	10.7	5	13.1	13.0
Yonkers	24	9.2	3	71	11.4	4	8.2	9.5

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 72 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population April 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended September 13, 1930, and September 14, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 13, 1930, and September 14, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929
New England States:								
Maine	1	2	1	....	15	21	0	0
New Hampshire	2	2	5	....	....	1	0	0
Vermont	1	....	....	....	....	....	0	0
Massachusetts	40	57	1	....	30	31	0	3
Rhode Island	4	9	....	....	1	2	1	0
Connecticut	7	19	1	1	4	5	1	0
Middle Atlantic States:								
New York	48	63	[1] 6	[1] 2	53	69	13	16
New Jersey	35	60	1	....	15	18	1	2
Pennsylvania	94	107	....	....	81	39	5	5
East North Central States:								
Ohio	31	36	14	14	12	19	6	5
Indiana	11	17	....	....	2	2	4	0
Illinois	88	108	3	2	7	41	4	5
Michigan	38	67	2	2	6	48	6	22
Wisconsin	8	14	12	16	27	34	3	1
West North Central States:								
Minnesota	13	11	1	1	2	2	0	1
Iowa	2	2	....	....	2	2	1	1
Missouri	19	28	3	11	7	4	5	6
North Dakota	6	14	....	....	....	4	0	4
South Dakota	25	2	....	....	1	1	0	0
Nebraska	2	4	....	....	1	8	0	0
Kansas	15	3	1	1	9	14	1	2
South Atlantic States:								
Delaware	4	1	....	....	2	....	0	0
Maryland [2]	12	8	5	1	3	1	1	1
District of Columbia	10	20	....	....	2	....	0	0
Virginia	....	....	....	....	....	....	....	....
West Virginia	14	19	4	14	6	22	0	3
North Carolina	118	206	24	....	5	1	2	4
South Carolina	41	86	177	....	....	....	2	0
Georgia	23	18	21	10	6	4	1	0
Florida	8	4	....	....	....	....	0	1
East South Central States:								
Kentucky	....	22	....	....	....	....	0	0
Tennessee	12	36	....	4	7	4	2	4
Alabama	27	60	6	2	2	2	1	2
Mississippi	18	43	....	....	....	....	0	....

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 13, 1930, and September 14, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929
West South Central States:								
Arkansas	1	8		3		1	1	0
Louisiana	12	24	9	2	3	4	0	0
Oklahoma [3]	15	19	6	11	1	4	2	4
Texas	25	30	30	8	1	6	1	0
Mountain States:								
Montana					2	11	1	1
Idaho					2	1	0	2
Wyoming		1			1		2	1
Colorado	6	2			3	6	1	1
New Mexico	5	5			1		0	0
Arizona	2	4	3			2	1	6
Utah [2]		1	2	13	2		0	7
Pacific States:								
Washington	6	8			10	13	0	1
Oregon	4	3	8	2	11	1	0	0
California	24	20	13	11	47	25	5	3

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929
New England States:								
Maine	10	2	4	16	0	0	2	0
New Hampshire	1	3	3	7	0	4	0	1
Vermont	0	1	2		0	0	0	0
Massachusetts	21	7	55	64	0	0	14	11
Rhode Island	1	3	4	1	0	0	3	2
Connecticut	0	0	14	7	0	0	12	3
Middle Atlantic States:								
New York	60	43	72	72	0	3	66	58
New Jersey	3	4	23	29	0	0	21	18
Pennsylvania	8	11	83	80	0	3	103	33
East North Central States:								
Ohio	65	14	85	81	31	9	79	47
Indiana	13	4	25	23	13	17	11	6
Illinois	36	1	75	101	13	6	41	31
Michigan	10	12	79	83	0	12	20	11
Wisconsin	8	0	22	34	4	6	7	11
West North Central States:								
Minnesota	28	3	23	59	0	0	4	5
Iowa	20	3	2	11	11	8	0	42
Missouri	12	2	18	24	0	5	28	5
North Dakota	1	1	7	10	0	4	11	1
South Dakota	7	0	10	10	3	10	0	0
Nebraska	17	0	14	11	14	3	4	7
Kansas	71	1	39	37	2	3	13	13
South Atlantic States:								
Delaware	0	1	4		0	0	12	7
Maryland [2]	0	1	11	13	0	0	58	24
District of Columbia	0	0	3	1	0	0	5	1
Virginia		10						
West Virginia	3	8	22	42	3	3	54	44
North Carolina	5	2	47	95	0	4	17	42
South Carolina	1	1	19	25	0	0	60	87
Georgia	1	2	22	21	0	0	46	29
Florida	0	0	3	6	0	0	1	1
East South Central States:								
Kentucky	1	1	14	23	1	0	31	50
Tennessee	2	1	22	18	1	0	41	63
Alabama	0	2	22	36	0	0	22	27
Mississippi	1	0	11	16	1	0	22	22

[2] Week ended Friday.

[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa and for 1929 are exclusive of Tulsa only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 13, 1930, and September 14, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929	Week ended Sept. 13, 1930	Week ended Sept. 14, 1929
West South Central States:								
Arkansas	2	0	0	6	0	0	27	22
Louisiana	7	0	5	20	0	1	19	27
Oklahoma [3]	11	2	15	26	2	2	29	52
Texas	2	0	4	17	12	23	13	17
Mountain States:								
Montana	0	0	15	16	0	3	4	18
Idaho	0	1	5	1	0	0	2	1
Wyoming	2	0	2	1	0	7	0	4
Colorado	1	0	6	4	0	1	14	8
New Mexico	0	0	1	1	0	3	13	5
Arizona	0	0	7	6	0	0	5	3
Utah [2]	0	0	3	6	0	0	3	2
Pacific States:								
Washington	2	1	29	23	12	11	5	4
Oregon	1	0	4	9	0	9	9	6
California	56	6	37	51	11	20	17	12

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa and for 1929 are exclusive of Tulsa only.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August, 1930										
Arkansas		5	21	269		95	24	14	12	126
Indiana	25	45	16		25		15	73	116	68
Iowa	4	12		10	4		16	27	43	8
Maine	1	15	4		17	1	14	44	0	13
New Hampshire		6	14				2	6	0	4
New Jersey	20	145	10	4	165		10	76	0	64
North Dakota	4	8			15		4	29	30	25
Pennsylvania	41	183		0	495	6	31	232	0	206
Porto Rico		28	17	1,407	14	2	0		0	29
Tennessee	16	43	12	355	27	58	6	76	9	529
Vermont		3			18		0	11	0	2

August, 1930

	Cases
Anthrax:	
Tennessee	1
Vermont	1
Chicken pox:	
Arkansas	18
Indiana	8
Iowa	7
Maine	12
New Jersey	30
North Dakota	4
Pennsylvania	159
Tennessee	10
Vermont	19
Dysentery:	
New Jersey	2
Pennsylvania	3
Porto Rico	13
Tennessee	21
Filariasis:	
Porto Rico	2
German measles:	
Maine	3
New Jersey	13
Pennsylvania	42
Hookworm disease:	
Arkansas	4
Impetigo contagiosa:	
Tennessee	6
Lead poisoning:	
New Jersey	6
Pennsylvania	2
Lethargic encephalitis:	
Maine	1
North Dakota	2
Pennsylvania	9
Tennessee	2
Mumps:	
Arkansas	4
Indiana	11
Iowa	9
Maine	14
New Jersey	43
North Dakota	34
Pennsylvania	168
Porto Rico	4
Tennessee	14
Vermont	16
Ophthalmia neonatorum:	
New Jersey	6
Pennsylvania	4
Porto Rico	2
Tennessee	7
Paratyphoid fever:	
Maine	7
New Jersey	3
Porto Rico	4
Puerperal septicemia:	
Pennsylvania	19
Porto Rico	10
Rabies in man:	
Pennsylvania	1
Tennessee	5
Septic sore throat:	
Maine	9
Tennessee	2
Sprue:	
Tennessee	1
Tetanus:	
New Jersey	2
Pennsylvania	6
Porto Rico	5
Tennessee	3
Tetanus, infantile:	
Porto Rico	23
Trachoma:	
Arkansas	5
Indiana	1
Pennsylvania	1
Tennessee	12
Tularaemia:	
Tennessee	1
Undulant fever:	
Indiana	8
Iowa	8
Maine	1
Pennsylvania	3
Tennessee	3
Vermont	2
Vincent's angina:	
Iowa	1
Maine	7
Tennessee	2
Whooping cough:	
Arkansas	44
Indiana	103
Iowa	38
Maine	142
New Jersey	272
North Dakota	64
Pennsylvania	829
Porto Rico	50
Tennessee	115
Vermont	63

Cases of Certain Communicable Diseases Reported for the Month of May, 1930, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	109	13	402	426	132	0	64	22	105
New Hampshire	------	5	------	------	61	0	------	0	------
Vermont	131	4	255	16	18	4	16	0	20
Massachusetts	848	236	6,448	667	947	0	636	12	1,171
Rhode Island	108	22	75	2	93	0	39	9	51
Connecticut	331	54	232	173	287	0	150	2	171
New York	2,072	507	10,613	2,310	1,974	29	1,864	73	1,644
New Jersey	721	379	5,564	------	853	1	503	11	342
Pennsylvania	2,360	527	6,805	1,529	1,843	2	[1] 675	53	1,013
Ohio	1,513	200	3,193	670	1,023	502	755	44	682
Indiana	292	60	800	55	594	689	279	18	173
Illinois	1,180	544	2,602	897	1,640	451	1,086	44	736
Michigan	985	250	7,309	925	1,056	269	547	16	863
Wisconsin	1,245	72	3,516	1,036	822	68	216	11	847
Minnesota	570	48	882	------	475	31	286	12	202
Iowa	227	26	1,551	136	248	429	38	1	65
Missouri	383	160	617	268	618	292	297	38	181
North Dakota	42	19	74	198	80	145	25	3	116
South Dakota	70	15	409	35	58	171	14	0	59
Nebraska	312	61	1,685	65	254	288	14	1	125
Kansas	309	41	2,654	370	237	221	122	22	387
Delaware	19	8	50	2	38	0	25	0	21
Maryland	661	83	382	95	334	0	286	22	161
District of Columbia	122	36	229	------	55	0	95	6	21
Virginia	579	68	2,505	------	104	23	205	33	803
West Virginia	204	37	416	------	107	159	115	57	201
North Carolina	641	94	210	------	113	47	------	29	1,380
South Carolina	378	112	284	209	25	16	187	108	611
Georgia	129	23	1,600	242	65	7	90	47	208
Florida	126	22	850	359	13	5	82	10	13
Kentucky [2]	------	------	------	------	------	------	------	------	------
Tennessee	167	27	1,180	102	215	83	206	59	119
Alabama	186	30	554	103	47	25	407	43	161
Mississippi	679	35	660	801	22	56	279	54	1,491
Arkansas	61	11	207	33	21	21	[1] 17	8	117
Louisiana	83	50	134	24	58	61	[1] 223	93	39
Oklahoma [3]	52	41	977	9	85	362	55	21	80
Texas [2]	------	------	------	------	------	------	------	------	------
Montana	42	4	79	165	111	17	17	3	36
Idaho	67	5	201	39	30	25	8	2	28
Wyoming	68	9	178	42	27	41	2	0	13
Colorado	301	37	3,632	703	85	46	177	13	332
New Mexico	56	18	210	188	42	38	107	11	8
Arizona	76	12	751	103	58	52	182	15	70
Utah [2]	------	------	------	------	------	------	------	------	------
Nevada	19	------	82	37	------	51	[1] 4	0	17
Washington	341	28	2,807	437	130	221	197	11	395
Oregon	198	19	420	128	71	106	50	6	214
California	1,391	225	8,858	2,762	531	259	974	55	1,088

[1] Pulmonary [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 1,000 Population (Annual Basis) for the Month of May, 1930

State	Chicken-pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	1.61	0.19	5.92	6.28	1.95	.00	0.94	0.32	1.55
New Hampshire		.13			1.57	.00		.00	
Vermont	4.38	.13	8.52	.53	.60	.13	.53	.00	.67
Massachusetts	2.28	.63	17.31	1.79	2.54	.00	1.71	.03	3.14
Rhode Island	1.72	.35	1.19	.03	1.48	.00	.62	.14	.81
Connecticut	2.25	.37	1.58	1.18	1.95	.00	1.02	.01	1.16
New York	2.07	.51	10.58	2.30	1.97	.03	1.86	.07	1.64
New Jersey	2.14	1.13	16.53		2.53	.00	1.49	.03	1.02
Pennsylvania	2.75	.61	7.93	1.78	2.15	.00	[1] .79	.06	1.18
Ohio	2.52	.33	5.33	1.12	1.71	.84	1.26	.07	1.14
Indiana	1.07	.22	2.92	.20	2.17	2.51	1.02	.07	.63
Illinois	1.83	.84	4.03	1.39	2.54	.70	1.68	.07	1.14
Michigan	2.42	.64	17.96	2.27	2.59	.66	1.34	.04	2.12
Wisconsin	4.85	.28	13.69	4.04	3.20	.26	.84	.04	3.30
Minnesota	2.40	.20	3.72		2.00	.13	1.21	.05	.85
Iowa	1.10	.13	7.50	.66	1.20	2.08	.18	.00	.31
Missouri	1.27	.53	2.05	.89	2.05	.97	.99	.13	.60
North Dakota	.77	.35	1.36	3.64	1.47	2.66	.46	.06	2.13
South Dakota	1.14	.25	6.09	.59	.95	2.80	.23	.00	.86
Nebraska	2.57	.50	13.85	.53	2.09	2.37	.12	.01	1.03
Kansas	1.97	.26	16.90	2.36	1.51	1.41	.78	.14	2.46
Delaware	.91	.38	2.39	.10	1.82	.00	1.20	.00	1.01
Maryland	4.71	.59	2.72	.68	2.38	.00	2.04	.16	1.15
District of Columbia	2.47	.73	4.63		1.11	.00	1.92	.12	.42
Virginia	2.59	.30	11.20		.47	.10	.92	.15	3.69
West Virginia	1.35	.24	2.75		.71	1.05	.76	.38	1.33
North Carolina	2.50	.37	.82		.44	.18		.11	5.38
South Carolina	2.34	.69	1.76	1.29	.15	.10	1.16	.67	3.78
Georgia	.46	.08	3.60	.87	.23	.03	.32	.17	.75
Florida	.98	.17	6.95	2.80	.10	.04	.64	.08	.10
Kentucky [2]									
Tennessee	.78	.13	5.48	.47	1.00	.39	.96	.27	.55
Alabama	.84	.13	2.49	.46	.21	.11	1.83	.19	.72
Mississippi	4.46	.23	4.34	5.27	.14	.37	1.83	.36	9.80
Arkansas	.36	.07	1.23	.20	.12	.12	[1] .10	.05	.69
Louisiana	.49	.30	.80	.14	.34	.36	[1] 1.32	.55	.23
Oklahoma [3]	.28	.22	5.22	.05	.45	1.93	.29	.11	.43
Texas [2]									
Montana	.90	.09	1.69	3.54	2.38	.36	.36	.06	.77
Idaho	1.38	.10	4.15	.81	.62	.52	.17	.04	.58
Wyoming	3.09	.41	8.09	1.91	1.23	1.86	.09	.00	.59
Colorado	3.16	.39	38.11	7.38	.89	.48	1.86	.14	3.48
New Mexico	1.63	.52	6.12	5.48	1.22	1.11	3.12	.32	.23
Arizona	1.78	.28	17.78	2.41	1.35	1.21	4.25	.35	1.64
Utah [2]									
Nevada	.29		1.25	.56		.78	[1] .06	.00	.26
Washington	2.47	.20	20.19	3.14	.94	1.59	1.42	.08	2.84
Oregon	2.52	.24	5.34	1.63	.90	1.35	.64	.08	2.72
California	3.41	.55	21.72	6.77	1.30	.64	2.39	.13	2.67

[1] Pulmonary. [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,050,000. The estimated population of the 90 cities reporting deaths is more than 30,500,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended September 6, 1930, and September 7, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	770	1,015	
96 cities	254	385	489
Measles:			
45 States	414	485	
96 cities	151	75	
Meningococcus meningitis:			
46 States	72	118	
96 cities	24	59	
Poliomyelitis:			
46 States	420	145	
Scarlet fever:			
46 States	946	1,025	
96 cities	264	314	301
Smallpox:			
46 States	175	202	
96 cities	19	24	6
Typhoid fever:			
46 States	1,073	931	
96 cities	131	109	175
Deaths reported			
Influenza and pneumonia:			
80 cities	337	348	
Smallpox:			
90 cities	0	0	

City reports for week ended September 6, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
NEW ENGLAND								
Maine:								
Portland	0	0	0	0	0	0	0	0
New Hampshire:								
Concord	0	0	0	0	0	0	0	0
Manchester	0	0	0		0	0	0	0
Vermont:								
Barre	0	0	0	0	0	0	0	0
Burlington	0	1	0		0	0	0	0
Massachusetts:								
Boston	4	18	4		0	11	1	15
Fall River	1	1	3		0	0	0	0
Springfield	0	1	1		0	0	1	0
Worcester	2	3	1		0	2	0	0
Rhode Island:								
Pawtucket	0	0	0		0	0	0	3
Providence	0	3	4		0	0	0	3
Connecticut:								
Bridgeport	0	3	0		0	0	0	0
Hartford	0	2	3		0	2	1	2
New Haven	0	1	0		0	0	3	0

Case Rates per 1,000 Population (Annual Basis) for the Month of May, 1930

State	Chicken-pox	Diphtheria	Measles	Mumps	Scarlet fever	Small-pox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	1.61	0.19	5.92	6.28	1.95	.00	0.94	0.32	1.55
New Hampshire	--------	.13	--------	--------	1.57	.00	--------	.00	--------
Vermont	4.38	.13	8.52	.53	.60	.13	.53	.00	.67
Massachusetts	2.28	.63	17.31	1.79	2.54	.00	1.71	.03	3.14
Rhode Island	1.72	.35	1.19	.03	1.48	.00	.62	.14	.81
Connecticut	2.25	.37	1.58	1.18	1.95	.00	1.02	.01	1.16
New York	2.07	.51	10.58	2.30	1.97	.03	1.86	.07	1.64
New Jersey	2.14	1.13	16.53	--------	2.53	.00	1.49	.03	1.02
Pennsylvania	2.75	.61	7.93	1.78	2.15	.00	[1] .79	.06	1.18
Ohio	2.52	.33	5.33	1.12	1.71	.84	1.26	.07	1.14
Indiana	1.07	.22	2.92	.20	2.17	2.51	1.02	.07	.63
Illinois	1.83	.84	4.03	1.39	2.54	.70	1.68	.07	1.14
Michigan	2.42	.64	17.96	2.27	2.59	.66	1.34	.04	2.12
Wisconsin	4.85	.28	13.69	4.04	3.20	.26	.84	.04	3.30
Minnesota	2.40	.20	3.72	--------	2.00	.13	1.21	.05	.85
Iowa	1.10	.13	7.50	.66	1.20	2.08	.18	.00	.31
Missouri	1.27	.53	2.05	.89	2.05	.97	.99	.13	.60
North Dakota	.77	.35	1.36	3.64	1.47	2.66	.46	.06	2.13
South Dakota	1.14	.25	6.09	.59	95	2.80	.23	.00	.96
Nebraska	2.57	.50	13.85	.53	2.09	2.37	.12	.01	1.03
Kansas	1.97	.26	16.90	2.36	1.51	1.41	.78	.14	2.46
Delaware	.91	.38	2.39	.10	1.82	.00	1.20	.00	1.01
Maryland	4.71	.59	2.72	.68	2.38	.00	2.04	.16	1.15
District of Columbia	2.47	.73	4.63	--------	1.11	.00	1.92	.12	.42
Virginia	2.59	.30	11.20	--------	.47	.10	.92	.15	3.59
West Virginia	1.35	.24	2.75	--------	.71	1.05	.76	.38	1.33
North Carolina	2.50	.37	.82	--------	.44	.18	--------	.11	5.38
South Carolina	2.34	.69	1.76	1.29	.15	.10	1.16	.67	3.78
Georgia	.46	.08	3.60	.87	.23	.03	.32	.17	.75
Florida	.98	.17	6.95	2.80	.10	.04	.64	.08	.10
Kentucky [2]	--------	--------	--------	--------	--------	--------	--------	--------	--------
Tennessee	.78	.13	5.48	.47	1.00	.39	.96	.27	.55
Alabama	.84	.13	2.49	.46	.21	.11	1.83	.19	.72
Mississippi	4.46	.23	4.34	5.27	.14	.37	1.83	.36	9.80
Arkansas	.36	.07	1.23	.20	.12	.12	[1] .10	.05	.69
Louisiana	.49	.30	.80	.14	.34	.36	[1] 1.32	.55	.23
Oklahoma [3]	.28	.22	5.22	.05	.45	1.93	.29	.11	.43
Texas [2]	--------	--------	--------	--------	--------	--------	--------	--------	--------
Montana	.90	.09	1.69	3.54	2.38	.36	.36	.06	.77
Idaho	1.38	.10	4.15	.81	.62	.52	.17	.04	.58
Wyoming	3.09	.41	8.09	1.91	1.23	1.86	.09	.00	.59
Colorado	3.16	.39	38.11	7.38	.89	.48	1.86	.14	3.48
New Mexico	1.63	.52	6.12	5.48	1.22	1.11	3.12	.32	.23
Arizona	1.78	.28	17.78	2.41	1.35	1.21	4.25	.35	1.64
Utah [2]	--------	--------	--------	--------	--------	--------	--------	--------	--------
Nevada	.29	--------	1.25	.56	--------	.78	[1] .06	.00	.26
Washington	2.47	.20	20.19	3.14	.94	1.59	1.42	.08	2.84
Oregon	2.52	.24	5.34	1.63	.90	1.35	.64	.08	2.72
California	3.41	.55	21.72	6.77	1.30	.64	2.39	.13	2.67

[1] Pulmonary. [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

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96 cities	151	75	
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46 States	72	118	
96 cities	24	59	
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Scarlet fever:			
46 States	946	1,025	
96 cities	264	314	301
Smallpox:			
46 States	175	202	
96 cities	19	24	6
Typhoid fever:			
46 States	1,073	931	
96 cities	131	109	175
Deaths reported			
Influenza and pneumonia:			
10 cities	337	348	
Smallpox:			
90 cities	0	0	

City reports for week ended September 6, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

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Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	0	0	0	0	0	0
New Hampshire:								
Concord	0	0	0	0	0	0	0	0
Manchester	0	0	0		0	0	0	0
Vermont:								
Barre	0	0	0	0	0	0	0	0
Burlington	0	1	0		0	0	0	0
Massachusetts:								
Boston	4	18	4		0	11	1	15
Fall River	1	1	3		0	0	0	0
Springfield	0	1	1		0	0	1	0
Worcester	2	3	1		0	2	0	0
Rhode Island:								
Pawtucket	0	0	0		0	0	0	3
Providence	0	3	4		0	0	0	3
Connecticut:								
Bridgeport	0	3	0		0	0	0	0
Hartford	0	2	3		0	2	1	2
New Haven	0	1	0		0	0	3	0

City reports for week ended September 6, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC								
New York:								
Buffalo	5	8	7	----------	0	2	0	13
New York	15	76	31	3	2	39	9	81
Rochester	0	3	1	----------	0	1	1	1
Syracuse	2	2	0	----------	0	1	1	1
New Jersey:								
Camden	2	2	0	----------	0	3	0	3
Newark	3	7	14	----------	0	2	2	3
Trenton	0	2	1	2	1	0	0	1
Pennsylvania:								
Philadelphia	2	28	7	3	4	10	8	20
Pittsburgh	0	12	2	----------	0	1	0	18
Reading	0	1	1	----------	0	0	0	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	0	5	2	----------	1	0	0	4
Cleveland	17	22	4	5	1	2	2	7
Columbus	4	2	0	----------	0	1	0	4
Toledo	1	4	0	----------	0	0	0	1
Indiana:								
Fort Wayne	0	2	0	----------	0	0	0	1
Indianapolis	1	3	2	----------	0	0	0	6
South Bend	0	1	1	----------	1	0	0	2
Terre Haute	0	0	0	----------	0	0	0	0
Illinois:								
Chicago	12	53	40	4	0	6	10	20
Springfield	0	1	0	----------	0	0	0	1
Michigan:								
Detroit	13	28	22	2	0	4	3	7
Flint	3	2	0	----------	0	3	0	2
Grand Rapids	1	1	1	----------	0	0	0	0
Wisconsin:								
Kenosha	1	0	0	----------	0	0	1	1
Madison	0	0	0	----------	----------	0	2	----------
Milwaukee	7	7	5	----------	0	3	7	3
Racine	0	0	1	----------	0	1	0	0
Superior	0	1	0	----------	0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0	----------	0	0	0	1
Minneapolis	3	13	4	----------	1	0	3	4
St. Paul	6	7	2	----------	0	0	1	4
Iowa:								
Davenport	0	1	0	----------	----------	0	0	----------
Des Moines	0	1	0	----------	----------	0	0	----------
Sioux City	1	0	0	----------	----------	0	0	----------
Waterloo	0	1	1	----------	----------	0	0	----------
Missouri:								
Kansas City	1	2	1	----------	0	2	0	3
St. Joseph	0	1	0	----------	0	0	0	1
St. Louis	0	18	9	----------	----------	12	5	----------
North Dakota:								
Fargo	0	0	0	----------	0	0	21	0
South Dakota:								
Sioux Falls	0	0	0	----------	----------	0	0	----------
Nebraska:								
Omaha	1	4	1	----------	0	0	0	3
Kansas:								
Topeka	0	0	0	1	1	2	0	0
Wichita	0	2	0	----------	0	0	1	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	0	0	----------	0	0	0	2
Maryland:								
Baltimore	1	14	7	----------	0	0	1	14
Cumberland	0	0	0	----------	0	0	0	0
Frederick	0	0	0	----------	0	0	0	0
District of Columbia:								
Washington	1	8	8	1	1	9	0	3

City reports for week ended September 6, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—con.								
Virginia:								
Lynchburg	0	1	2		0	0	0	1
Norfolk	1	0	0		0	0	0	1
Richmond	1	12	6		0	1	0	2
Roanoke	0	3	1		0	0	0	2
West Virginia:								
Charleston	0	1	0		0	0	0	0
Wheeling	0	1	0		0	0	0	0
North Carolina:								
Raleigh	0	2	0		0	0	0	0
Wilmington	0	1	2		0	0	0	1
Winston-Salem	0	2	2	1	1	0	0	1
South Carolina:								
Charleston	0	1	0	16	0	0	1	1
Columbia	1	1	1		0	0	4	2
Georgia:								
Atlanta	0	6	4	4	1	4	0	2
Brunswick	0	0	0		0	0	0	0
Savannah	0	1	0	1	1	0	0	3
Florida:								
Miami	0	1	0		0	1	0	0
St. Petersburg		0			0			0
Tampa	0	1	0		0	0	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	0	0	2
Tennessee:								
Memphis	3	3	5		0	0	0	3
Nashville	0	3	0		0	1	0	5
Alabama:								
Birmingham	0	4	2		0	3	2	2
Mobile	0	1	0		0	0	0	2
Montgomery	0	2	1			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith		0						
Little Rock	0	0	0			0	0	2
Louisiana:								
New Orleans	0	7	8	1	1	0	0	6
Shreveport	0	1	0		0	0	1	0
Oklahoma:								
Oklahoma City	0	2	3		1	0	0	1
Tulsa	0	1	0			0	0	
Texas:								
Dallas	0	6	3	1	1	0	0	1
Fort Worth	0	2	2		0	0	0	1
Galveston	0	0	3		0	0	0	0
Houston	0	4	2		0	0	0	3
San Antonio	0	2	0		1	0	0	2
MOUNTAIN								
Montana:								
Billings	0	0	0		0	0	0	0
Great Falls	0	0	0		0	0	0	0
Helena	0	0	0		0	0	0	0
Missoula	0	0	0		0	1	0	0
Idaho:								
Boise	0	0	0		0	0	0	0
Colorado:								
Denver	1	9	5		0	1	1	5
Pueblo	2	1	0		0	2	0	0
New Mexico:								
Albuquerque	0	0	2		0	0	0	1
Arizona:								
Phoenix	0	0	1		0	1	0	2
Utah:								
Salt Lake City	2	3	0		1	2	2	1
Nevada:								
Reno	0	0	0		0	0	0	0

City reports for week ended September 6, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
PACIFIC								
Washington:								
Seattle	3	2	5			2	8	
Spokane	0	1	1			0	0	
Tacoma	1	1	0		0	0	1	2
Oregon:								
Portland	0	4	0		0	4	7	1
Salem	1	0	1		0	1	0	0
California:								
Los Angeles	10	23	9	5	0	8	12	7
Sacramento	0	2	0		0	0	3	1
San Francisco	10	10	1	2	0	7	6	1

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	1	2	0	0	0	0	1	3	0	2	23
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	9
Manchester	1	0	0	0	0	0	0	0	0	0	19
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	0	2
Burlington	0	0	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	15	10	0	0	0	9	3	0	0	30	179
Fall River	1	2	0	0	0	2	0	1	0	3	15
Springfield	1	0	0	0	0	1	0	0	0	4	22
Worcester	2	7	0	0	0	4	0	0	0	14	42
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	11
Providence	2	3	0	0	0	1	0	1	0	11	49
Connecticut:											
Bridgeport	1	0	0	0	0	0	0	0	0	0	34
Hartford	1	1	0	0	0	1	0	0	0	1	35
New Haven	1	0	0	0	0	2	2	0	0	1	27
MIDDLE ATLANTIC											
New York:											
Buffalo	6	2	0	0	0	16	1	3	1	22	151
New York	24	16	0	0	0	95	43	19	3	96	1,227
Rochester	1	1	0	0	0	0	0	0	0	12	69
Syracuse	1	0	0	0	0	0	0	0	0	14	40
New Jersey:											
Camden	0	1	0	0	0	0	0	10	2	0	28
Newark	4	4	0	0	0	7	2	0	0	11	88
Trenton	1	1	0	0	0	1	0	0	0	2	35
Pennsylvania:											
Philadelphia	17	21	1	0	0	20	11	7	0	19	401
Pittsburgh	10	6	0	0	0	8	4	6	1	20	134
Reading	0	0	0	0	0	0	0	0	0	0	21
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	1	0	0	0	5	2	4	2	1	123
Cleveland	11	4	0	0	0	14	4	0	0	19	171
Columbus	3	0	0	0	0	3	2	0	1	0	58
Toledo	3	3	0	0	0	3	1	2	0	5	59
Indiana:											
Fort Wayne	1	0	0	0	0	0	1	0	0	0	15
Indianapolis	4	0	0	2	0	7	1	0	0	7	
South Bend	1	0	0	0	0	0	0	0	0	0	15
Terre Haute	1	0	0	0	0	0	0	0	0	0	17

City reports for week ended September 6, 1930—Continued

Division, State and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST NORTH CENTRAL—continued											
Illinois:											
Chicago	29	35	0	0	0	39	6	6	1	58	579
Springfield	1	0	0	0	0	1	1	0	0	4	13
Michigan:											
Detroit	25	14	0	1	0	19	4	3	2	62	211
Flint	5	3	0	0	0	3	1	1	0	4	25
Grand Rapids	3	4	0	0	0	0	0	0	0	7	28
Wisconsin:											
Kenosha	0	0	1	0	0	0	0	0	0	4	2
Madison	1	2	0	0			0	0		12	
Milwaukee	10	8	0	0	0	4	0	5	0	36	101
Racine	2	5	0	0	0	0	1	0	0	10	13
Superior	1	1	0	1	0	0	0	0	0	7	
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	3	0	0	0	0	0	0	0	5	17
Minneapolis	14	2	0	0	0	3	1	1	1	2	92
St. Paul	6	0	0	0	0	5	1	1	0	6	64
Iowa:											
Davenport	1	0	0	4			0	0		0	
Des Moines	2	2	0	0			0	0		0	29
Sioux City	0	0	0	0			1	0		2	
Waterloo	0	1	0	0			0	0		2	
Missouri:											
Kansas City	3	4	0	0	0	4	2	0	1	7	92
St. Joseph	1	3	0	0	0	1	0	0	0	2	14
St. Louis	10	10	0	5	0	10	7	4	0	0	183
North Dakota:											
Fargo	0	0	0	0	0	0	1	0	0	4	4
South Dakota:											
Sioux Falls	1	0	0	0			0	0		0	8
Nebraska:											
Omaha	1	5	0	2	0	0	1	0	0	0	46
Kansas:											
Topeka	2	1	0	0	0	0	0	0	0	5	18
Wichita	2	1	0	0	0	0	2	1	1	0	30
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	0	0	0	0	0	0	0	0	0	26
Maryland:											
Baltimore	6	9	0	0	0	10	9	7	1	19	196
Cumberland	0	0	0	0	0	0	0	0	0	0	10
Frederick	0	0	0	0	0	0	0	0	0	0	
District of Columbia:											
Washington	5	4	0	0	0	9	4	2	3	1	131
Virginia:											
Lynchburg	0	1	0	0	0	1	1	1	0	0	12
Norfolk	0	2	0	0	0	2	1	6	0	0	
Richmond	3	8	0	0	0	4	3	3	1	0	47
Roanoke	1	0	0	2	0	0	0	1	0	2	21
West Virginia:											
Charleston	2	2	0	0	0	1	2	[1] 5	2	0	25
Wheeling	1	0	0	0	0	1	1	0	0	0	19
North Carolina:											
Raleigh	0	1	0	0	0	0	0	0	1	1	16
Wilmington	0	1	0	0	0	1	0	0	0	2	7
Winston-Salem	1	4	0	0	0	3	0	1	1	0	22
South Carolina:											
Charleston	0	2	0	0	0	1	3	0	0	0	21
Columbia	1	0	0	0	0	3	1	1	0	0	
Georgia:											
Atlanta	5	3	0	0	0	6	4	[2] 7	0	4	69
Brunswick	0	0	0	0	0	0	0	0	0	0	5
Savannah	0	1	0	0	0	3	1	0	1	0	29
Florida:											
Miami	0	0	0	0	0	1	1	0	0	0	28
St. Petersburg	0		0		0	0	0		0		4
Tampa	0	0	0	0	0	1	0	1	0	1	18

[1] Includes nonresidents.

[2] Nonresidents.

City reports for week ended September 6, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	0	0	0	0	0	0	0	1	0	28
Tennessee:											
Memphis	1	5	0	0	0	6	6	2	0	4	59
Nashville	1	0	0	0	0	2	6	4	0	4	38
Alabama:											
Birmingham	3	4	1	0	0	6	5	2	0	0	91
Mobile	1	0	0	0	0	1	0	0	0	0	29
Montgomery	0	1	0	0			1	0		4	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0		0				0				
Little Rock	1	0	0	0	0	5	2	1	0	0	
Louisiana:											
New Orleans	1	14	0	0	0	13	4	9	1	5	135
Shreveport	1	0	0	0	0	0	1	2	0	0	22
Oklahoma:											
Oklahoma City	2	3	0	0	0	3	3	0	3	0	36
Tulsa	1	3	1	0			2	2		4	
Texas:											
Dallas	2	1	0	0	0	4	1	0	0	5	48
Fort Worth	0	1	0	1	0	1	1	0	2	0	26
Galveston	0	0	0	0	0	0	0	0	0	0	17
Houston	1	2	0	0	0	2	1	1	0	0	51
San Antonio	1	1	0	0	0	9	0	0	0	0	53
MOUNTAIN											
Montana:											
Billings	0	1	0	0	0	0	0	0	0	2	3
Great Falls	0	3	0	0	0	0	0	0	0	0	5
Helena	0	0	0	0	0	0	0	0	0	2	4
Missoula	0	0	0	0	0	0	1	1	0	0	7
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	0	4
Colorado:											
Denver	3	0	0	0	0	1	1	0	1	17	80
Pueblo	0	0	0	0	0	0	1	0	0	1	8
New Mexico:											
Albuquerque	0	0	0	0	0	3	1	2	0	3	
Arizona:											
Phoenix	1	0	0	0	0	3	0	0	0	0	
Utah:											
Salt Lake City	1	0	0	0	0	0	2	0	0	15	
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	8
PACIFIC											
Washington:											
Seattle	3	8	0	0			2	0		30	
Spokane	2	0	0	2			0	1		1	
Tacoma	1	0	1	1	0	0	2	0	0	0	19
Oregon:											
Portland	3	3	3	1	0	1	0	0	0	2	50
Salem	0	0	1	0	0	0	0	0	0	1	
California:											
Los Angeles	9	4	1	1	0	29	3	2	0	18	191
Sacramento	1	0	0	0	0	1	0	0	0	0	
San Francisco	6	2	1	2	0	11	1	1	0	13	160

City reports for week ended September 6, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	7	1
Massachusetts:									
Boston	0	0	4	0	0	0	3	6	1
Worcester	0	0	0	0	0	0	0	1	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	0	0	0	0	1	5	3
New York	6	3	3	2	1	0	17	0	0
Rochester	0	0	0	0	0	0	0	2	0
Syracuse	0	0	0	0	0	0	2	7	2
New Jersey:									
Newark	0	0	0	0	0	0	1	1	0
Trenton	1	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	1	5	0	0	1	0	1	8	0
Pittsburgh	0	0	0	1	0	0	1	0	1
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	1	0	0	0	0	0	3	1
Cleveland	0	1	0	0	0	0	1	13	2
Toledo	1	0	0	0	0	0	1	2	0
Illinois:									
Chicago	1	0	1	0	1	1	3	10	2
Springfield	0	0	0	0	0	0	0	1	0
Michigan:									
Detroit	4	4	1	1	0	1	3	6	0
Flint	1	1	0	0	0	0	0	1	0
Grand Rapids	0	0	0	0	0	0	1	1	0
Wisconsin:									
Milwaukee	0	0	0	0	0	0	1	3	0
Racine	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	0	0	0	0	0	0	0	0
Iowa:									
Des Moines [1]	0	0	0	0	0	0	1	1	0
Waterloo	1	0	0	0	0	0	0	6	0
Missouri:									
Kansas City	0	3	0	0	0	0	0	2	0
St. Louis	2	0	0	0	0	0	0	0	0
Nebraska:									
Omaha	1	0	0	0	0	0	1	0	0
Kansas:									
Topeka	0	0	0	0	0	0	0	1	0
Wichita	0	0	0	0	0	0	0	7	1
SOUTH ATLANTIC [1]									
Delaware:									
Wilmington	0	0	0	0	0	0	0	1	0
District of Columbia:									
Washington	0	0	2	1	0	0	0	1	0
Virginia:									
Norfolk	0	0	0	0	0	1	0	0	0
West Virginia:									
Wheeling	0	0	0	0	0	0	0	1	0
North Carolina:									
Raleigh	0	0	0	0	1	2	0	0	0
Wilmington	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	2	0	0	1	0
Columbia	1	0	0	0	0	0	0	0	0
Georgia:									
Atlanta	0	0	1	1	0	0	0	0	0
Savannah [1]	0	0	0	0	1	1	0	0	0

[1] Typhus fever, 5 cases: 1 case at Des Moines, Iowa; 1 case at Cumberland, Md.; 2 cases at Savannah Ga.; and 1 case at Tampa, Fla.

City reports for week ended September 6, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	1	0	0	0	0	0	1	0
Alabama:									
Birmingham	0	1	0	0	2	2	0	1	0
Mobile	0	1	0	0	0	0	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	2	2	0	1	0
Oklahoma:									
Tulsa	0	0	0	0	0	0	0	2	0
Texas:									
Dallas	0	0	0	0	0	2	0	1	0
Houston	0	0	0	0	0	0	0	1	0
MOUNTAIN									
Montana:									
Great Falls	0	0	0	0	0	0	0	1	0
Colorado:									
Denver	1	1	0	0	0	1	0	1	2
New Mexico:									
Albuquerque	1	0	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Spokane	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	0	0	0	0	0	1	2	17	2
Sacramento	1	0	0	0	0	0	0	0	0
San Francisco	0	0	0	0	0	0	1	5	0

[1] Typhus fever, 5 cases: 1 case at Des Moines, Iowa; 1 case at Cumberland, Md.; 2 cases at Savannah, Ga.; and 1 case at Tampa, Fla.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended September 6, 1930, compared with those for a like period ended September 7, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, August 3 to September 6, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929
98 cities	38	[2] 63	31	61	34	61	[3] 40	62	[4] 41	[5] 64
New England	31	45	40	38	40	63	[6] 53	45	35	[5] 46
Middle Atlantic	34	70	23	59	28	58	31	54	31	45
East North Central	48	81	36	86	41	69	46	75	49	86
West North Central	28	31	27	23	25	25	27	25	34	38
South Atlantic	16	30	35	47	37	75	[7] 60	90	60	92
East South Central	20	[2] 30	34	82	13	55	13	116	54	75
West South Central	52	118	52	122	67	141	71	137	[4] 61	133
Mountain	17	35	17	44	43	26	[8] 70	17	43	70
Pacific	66	43	35	31	26	29	19	27	38	34

MEASLES CASE RATES

	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929
98 cities	50	[2] 30	33	24	28	20	[3] 20	14	[4] 25	[5] 12
New England	91	31	60	29	60	38	[6] 19	20	33	[5] 21
Middle Atlantic	65	15	41	15	33	13	23	8	28	7
East North Central	28	58	19	35	21	33	8	22	13	16
West North Central	51	33	30	13	19	8	27	8	30	2
South Atlantic	22	9	22	15	18	0	[7] 30	13	26	2
East South Central	20	[2] 7	20	0	7	14	13	7	27	14
West South Central	11	19	7	23	0	4	11	8	[4] 0	4
Mountain	112	61	43	52	26	52	[8] 35	44	51	26
Pacific	73	24	50	46	47	39	35	19	40	46

SCARLET FEVER CASE RATES

	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929
98 cities	32	[2] 44	31	39	33	41	[3] 42	41	[4] 43	[5] 52
New England	42	52	51	49	47	45	[6] 53	38	55	[5] 83
Middle Atlantic	21	23	18	17	27	15	28	16	25	25
East North Central	46	72	39	50	35	63	48	63	47	70
West North Central	27	44	28	40	34	58	42	44	57	67
South Atlantic	18	41	26	73	27	34	[7] 67	45	66	64
East South Central	13	[2] 15	54	14	34	68	115	34	67	41
West South Central	37	42	34	38	37	65	15	72	[4] 69	34
Mountain	69	44	43	78	86	44	[8] 88	61	34	17
Pacific	45	56	38	53	33	51	31	46	33	77

SMALLPOX CASE RATES

	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929
98 cities	3	[2] 5	3	7	2	3	[3] 2	4	[4] 3	[5] 4
New England	0	0	0	0	0	0	[6] 0	0	0	[5] 0
Middle Atlantic	0	0	0	3	0	0	0	0	0	0
East North Central	6	12	3	16	0	4	0	10	3	10
West North Central	6	10	6	4	8	6	8	4	13	2
South Atlantic	2	0	0	0	2	0	[7] 0	0	4	0
East South Central	0	[2] 7	7	7	0	0	0	0	0	0
West South Central	7	0	4	0	7	8	4	4	[4] 0	0
Mountain	0	0	0	9	0	26	[8] 0	0	0	9
Pacific	5	17	14	12	12	17	12	14	14	14

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930, and 1929, respectively.
[2] Montgomery, Ala., not included.
[3] Hartford, Conn., Columbia, S. C., and Helena, Mont., not included.
[4] Fort Smith, Ark., not included.
[5] Pawtucket, R. I., not included.
[6] Hartford, Conn., not included.
[7] Columbia, S. C., not included.
[8] Helena, Mont., not included.

Summary of weekly reports from cities, August 3 to September 6, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929
98 cities	17	[2] 17	21	20	19	30	[3] 25	27	[4] 21	[5] 18
New England	4	13	4	11	16	27	[6] 12	29	11	[5] 2
Middle Atlantic	10	11	15	19	14	34	21	28	22	20
East North Central	11	11	10	5	9	12	10	13	12	13
West North Central	19	15	28	6	21	13	19	23	13	12
South Atlantic	60	22	40	39	55	51	[7] 82	52	53	34
East South Central	67	[2] 45	148	123	88	103	47	103	54	55
West South Central	15	61	45	46	26	88	71	50	[4] 50	15
Mountain	34	9	26	61	26	70	[8] 44	17	9	44
Pacific	12	29	14	17	7	5	9	12	9	14

INFLUENZA DEATH RATES

	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929
91 cities	3	1	1	3	3	3	[3] 4	2	3	[5] 3
New England	0	0	0	0	0	2	[6] 0	0	0	[5] 2
Middle Atlantic	2	1	2	2	3	3	3	2	3	2
East North Central	1	1	0	2	1	4	4	2	2	6
West North Central	3	6	3	3	0	0	3	0	6	0
South Atlantic	9	0	0	0	7	2	[7] 7	2	7	4
East South Central	0	0	0	22	0	0	7	0	0	7
West South Central	0	0	0	12	4	8	8	4	11	0
Mountain	17	0	0	17	9	9	[8] 0	9	9	0
Pacific	6	0	0	3	9	0	3	0	0	3

PNEUMONIA DEATH RATES

	Aug. 9, 1930	Aug. 10, 1929	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929
91 cities	53	53	55	57	46	54	[3] 53	55	55	[5] 57
New England	42	38	38	52	51	25	[6] 48	49	51	[5] 44
Middle Atlantic	59	60	72	71	55	60	60	61	68	75
East North Central	47	43	28	35	28	47	50	51	36	44
West North Central	44	45	27	33	35	48	38	33	50	57
South Atlantic	66	41	68	62	48	73	[7] 52	56	62	64
East South Central	52	60	59	90	74	37	52	52	103	75
West South Central	57	121	92	78	61	66	38	98	54	31
Mountain	69	61	120	35	51	52	[8] 53	44	51	52
Pacific	43	41	49	72	49	50	55	28	34	31

[2] Montgomery, Ala., not included.
[3] Hartford, Conn., Columbia, S. C., and Helena, Mont., not included.
[4] Fort Smith, Ark., not included.
[5] Pawtucket, R. I., not included.
[6] Hartford, Conn., not included.
[7] Columbia, S. C., not included.
[8] Helena, Mont., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended August 30, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended August 30, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia						2
New Brunswick						2
Quebec	1		1	1		28
Ontario	2	2		50	2	28
Manitoba				2	1	3
Saskatchewan	1			3		
Alberta				18		1
British Columbia						4
Total	4	2	1	74	3	68

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended September 6, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended September 6, 1930, as follows:

Disease	Cases	Disease	Cases
Chicken pox	4	Poliomyelitis	3
Diphtheria	21	Scarlet fever	38
Erysipelas	2	Tuberculosis	51
Measles	5	Typhoid fever	18
Mumps	5	Whooping cough	32
Ophthalmia neonatorum	1		

CUBA

Habana—Communicable diseases—August, 1930.—During the month of August, 1930, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	1		Paratyphoid fever	1	
Diphtheria	8		Scarlet fever	7	
Leprosy	2		Tuberculosis	34	5
Malaria	12		Typhoid fever	19	4

Provinces—Communicable diseases—Four weeks ended August 2, 1930.—During the four weeks ended August 2, 1930, cases of certain communicable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		2		2			4
Chicken pox		2	1	1			4
Diphtheria	1	16	3	2	3	4	29
Malaria	3	15		1	7	46	72
Measles		1					1
Paratyphoid fever	1	3		4		2	10
Poliomyelitis		1					1
Scarlet fever		8	1	2	1		12
Typhoid fever	4	36	13	62	17	29	161

ITALY

Communicable diseases—Four weeks ended May 11, 1930.—During the four weeks ended May 11, 1930, certain communicable diseases were reported in Italy, as follows:

	Apr. 14-20		Apr. 21-27		Apr. 28-May 4		May 5-11	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	18	16	18	17	15	14	23	18
Cerebrospinal meningitis	13	9	15	14	23	19	12	11
Chicken pox	403	147	272	120	307	114	405	157
Diphtheria and croup	587	286	494	278	360	240	531	290
Dysentery	4	2	2	2	7	5	5	4
Lethargic encephalitis					3	3	1	1
Measles	2,919	398	3,188	449	3,328	427	3,182	505
Poliomyelitis	6	6	2	2	3	3	5	4
Scarlet fever	445	145	329	138	331	118	446	154
Typhoid fever	239	133	218	134	254	141	296	177

YUGOSLAVIA

Communicable diseases—July, 1930.—During the month of July, 1930, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Diseases	Cases	Deaths
Anthrax	90	9	Poliomyelitis	2	
Cerebrospinal meningitis	5	6	Puerperal sepsis	7	4
Diphtheria and croup	558	80	Rabies	2	2
Dysentery	302	15	Scarlet fever	836	118
Erysipelas	191	15	Tetanus	51	23
Lethargic encephalitis	1		Typhoid fever	382	38
Measles	362	14			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13
Afghanistan	C									[1] P						P			
China:																			
Canton	C			3		2				2	1								
	D									1									
Shanghai	C																8	4	
Swatow	C			3	4	3							1						
India	C	10,817	41,462	56,311	10,088	10,103	10,162	6,767	6,728	5,520	5,701								
	D	5,866	27,906	44,878	7,802	7,110	6,455	4,344	3,712	3,095	3,133								
Bassein	C		7	7														1	
	D		5	5															
Bombay	C	4												2	3	6			
	D													1	1	4			
Calcutta	C	354	647	609	78	78	94	77	81	53	49	37	18	10	17	18	8		
	D	220	414	372	44	36	36	63	54	28	23	23	7	7	10	6	3		
Negapatam	C					1													
	D					1													
Rangoon	C	2	1	9	1	1	2	2	1										
	D	2	1	3	1	1	1	1	1										
India (French):																			
Chandernagor	C	1	6	6			1	2			1								
	D	3	5	6			1	1											
Karikal	C	12	1					3											
	D	9	1					3											
Indo-China (see also table below):																			
Pnompenh	C		2	1	5	10	11	14	9	16	7		5	3	3				
	D	6		5	1	4	7	6	6	9	5	2	3	2	1				
Saigon and Cholon	C	14	76	160	17	19	7	5	7	1	1	1	2	2	1				
	D	6	55	101	11	10	2		3					1					

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	June, 1930: 14	June, 1930: 21	June, 1930: 28	July, 1930: 5	July, 1930: 12	July, 1930: 19	July, 1930: 26	August, 1930: 2	August, 1930: 9	August, 1930: 16	August, 1930: 23	August, 1930: 30	September, 1930: 6	September, 1930: 13
Philippine Islands:[1]																			
Ports—																			
Cebu	C							1	20	13	13	9	5	4			1	1	
	D								9	7	12	8	4	4			1	1	
Iloilo	C									1	11	17	9	19	32	4	3	4	1
	D										9	13	10	18	19	9	4	5	2
Manila	C			1										1			16	13	5
	D																5	6	1
Provinces—																			
Antique	C												14	4		3	2	21	12
	D												7	4		2	1	10	12
Bohol	C													45	67	31	24	26	4
	D													26	37	15	11	11	2
Bulacan	C				1			2		1	1	2	1				1	1	1
	D				1												1		
Capiz	C										2	1	1	1			1		
	D										1	1	1	1					
Cebu	C			1	13	26	118	198	313	222	115	63	55	37	4		1	16	8
	D			1	11	23	50	86	131	83	60	29	32	27	3		1	6	4
Iloilo	C						1	1	20	45	85	159	143	227	176	88	74	57	66
	D							1	10	23	64	96	77	164	119	64	51	44	37
La Union	C									1									
Leyte	C						21	26	11										
	D						12	7	11										
Masbate	C							10	14	32	25	21	15	27					
	D							3	2	18	5	10	5	11					
Misamis, Occidental	C								1	2									
	D								1	2									
Negros, Occidental	C			10	5	55	50	30	62	163	172	171	151	99	50	72	40	47	21
	D			7	2	27	36	23	42	90	122	114	97	72	34	47	31	32	18
Negros, Oriental	C								1	1	6	15	6	2					
	D									1	3	9	1	3					
Nueva Acija	C											1							
	D											1							

Pampanga	C						1	1	2								1		
Pangasinan	C								2		1		1						
	D								2				1						
Rizal	C					1				1									
	D					1				1									
Samar	C													5	4	10			2
	D													5	3	8			2
Surigao	C													15	4	21	3		
	D													9	2	10	3		
Tarlac	C												1						
Siam	C	1	29	33	8	10	6	3	8	3	8	1				15			
	D		13	21	3	9	4	3	4	1	3	1				1			
Bangkok	C	2	15	9	5	3	3	1		3	4	1	1		1				
	D	1	4	3		3		2		1	1	1	1		1				
Nagara Pathom	C		10																
	D		2																
Songkla	C									8		2							
	D									4		2							
On vessel:																			
S. S. Sassari at Massoua, from Jeddah	C			1															
	D			1															
On small boat at Port Cebu, from Bantayan Island	C				1														
	D				1														

Place		February, 1930	March, 1930	April, 1930	May, 1930			June, 1930			July, 1930			August, 1930	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):															
Annam [1]	C	4	52	60		20	3	2	14				1		3
Cambodia [1]	C	90	81	24	5	31	52	56	88				43	37	22
Cochin-China [1]	C	65	82	48	188	224	259	147	126				46	22	5

[1] Reports incomplete.
[2] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30	September, 1930: 6	Sept. 13
Algeria:																			
Algiers	C									1	2			1		6	1		
Constantine	C				1				1										
Oran	C										2	1	1	1	1	1	2		
Philippeville	C																	1	
Azores: Ponta Delgada	C		8																
	D		5																
Belgian Congo	C								2				1		1		2		
	D								2				1		1				
British East Africa (see also table below):																			
Tanganyika	C		44																
	D		20																
Uganda	C	98	117	227	121	77	105	103		50	100	78	52						
	D	87	105	195	75	70	93	90		47	97	69	50						
Canary Islands: Las Palmas	D													1					
Ceylon:																			
Colombo	C	4	1	6	1				1	2					1	1	2		
	D	4	1	5	1				1	2					1	1	3		
Plague-infected rats		2	4		1														
Chile: Antofagasta	C	1	1																
	D	2	1																
Dutch East Indies:																			
Batavia and West Java	C	124	87	82	19	27	28	24	19	25	18	22	19						
	D	122	81	82	19	27	28	24	19	25	18	22	19						
Plague-infected rats		3	8	5	3	1								1					
Java and Madura	D	223	173	185	40	45	63	54	55	56	58	48	45	51					
Ecuador (see table below).																			
Egypt:																			
Alexandria	C	4	2	13	3	6	6	4	8	8	3	4	2	2	4	3	3	3	2
	D	1	2	3	2		2	5	2	3	2	3	2	1	3		5	1	2
Assiout	C		14	20	4	2	3		1	1									
	D		5	5		1		2	1	1									
Beheira	C	4																	
Beni-Suef	C	4														1			

Dakahlieh	C	5	5	11	1														
	D	1		2															
Gharbieh	C		1										3						
	D		1										1						
Girga	C		1							1									
Minieh	C			7	1	1	4	4	2	1									
	D			1		1													
Port Said	C		1	2	1			1				1	1						
France:																			
Marseilles	C																2	2	
St. Ouen	C										1								
	D										1								
Gambia	C															4			
																4			
Greece (see also table below):																			
Patras	C	1					1				1								
Pyrgos	C	1																	
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats							1												
India	C	4,087	2,215	648	55	59	62	64	70	75	87								
	D	3,344	1,960	635	42	52	43	50	46	46	62								
Bassein	C	3															1		
	D	1															1		
Bombay	C	7	4	6	1		2					1							
	D	5	8	5			1	1				1							
Plague-infected rats		86	108	81	6	7	8	5	13	14	10	15	10	8	9	9	12		
Madras Presidency	C	157	44	38	26	10	3		10	1	10	26			7				
	D	87	19	11	15	2	5		4	1	9	17			1				
Rangoon	C	3	5	4				1				2	2	1			2		
	D	3	4	3				1				2	1	1			2		
Plague-infected rats		3	4	5			1		2	2		2	4		2	1	2		
India (Portuguese)	D			7															
Indo-China (see also table below):																			
Pnompenh	C		3	3	6					1	1			2		2	2		
	D	13	4	1	5	1		1		1	1								
Saigon and Cholon	C	1		1	1		1											1	
	D	1					1												
Iraq: Baghdad	C	7	6	37	12	4	8	4	10	4	2	2	4	3	2				
	D	4	2	18	7	3	5		5		1	1		2	1				
Japan: Osaka (vicinity of)—Plague-infected rats		4	3																
Kwang-Chow-Wan	C	7	37	34	23		8					4			1				
Madagascar (see also table below): Tamatave	C		1		1														
Morocco	C	55	121	71	2		1					1		8	7				
	D	18	45	34	4									1	1				
Nigeria: Lagos	C	13		2	1		3	1	1				2	1	3				
	D	5		2	1		3	1	1				2	1	3				
Plague-infected rats		25	7	17	1	4	1	5	2	3	6	7							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930 7	June 14	June 21	June 28	July, 1930 5	July 12	July 19	July 26	August, 1930 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30	September, 1930 6	Sept. 13
Senegal (see table below).																			
Siam	C	16	5	5								3							
	D	15	6	4								3							
Bangkok	C	5		5									1	2					
	D	4		4										2					
Nagara Pathom	C	1	10																
	D	1	9																
Nagara Rajsima	C	1	1										1			1			
	D	1	1										1			1			
Syria: Beirut	C					2	5	5		2	4	3		1		1	3		
Tripolitania	C														2				
Tunisia:																			
Sfax district	C		1	21	6		3					6		1					
Tunis	C	1	4	1		1				1	4								
	D				1					1									
Union of Socialist Soviet Republics:																			
Salsk Region	C				1			1											
	D				1														
Stavropol Region	C				1														
	D				1														
Union of South Africa:																			
Cape Province	C	1		P	1						1								
	D	1									1				1				
Orange Free State	C	5	1																
	D	3																	
Transvaal	C	1																	
	D	1																	

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
British East Africa (see also table above):							
Kenya	C	85	16	171	107	97	-------
Ecuador: Guayaquil	C	2	0	0	0	-------	-------
	D	0	0	0	0	-------	-------
Plague-infected rats		2	0	0	0	-------	-------
Greece (see also table above)	C	-------	1	-------	1	-------	-------
Indo-China (see also table above)	C	27	4	-------	11	1	2
Madagascar (see also table above):							
Ambositra Province	C	25	14	1	-------	-------	-------
	D	20	12	1	-------	-------	-------
Antisirabe Province	C	38	46	19	3	-------	-------
	D	36	45	19	3	-------	-------
Itasy Province	C	4	-------	-------	-------	-------	-------
	D	4	-------	-------	-------	-------	-------
Miarinarivo Province	C	14	1	5	1	-------	-------
	D	14	1	5	1	-------	-------
Madagascar (see also table above)—Con.							
Moramanga Province	C	5	3	1	3	-------	-------
	D	5	3	-------	3	-------	-------
Tananarive Province	C	52	39	15	16	-------	-------
	D	52	38	14	16	-------	-------
Senegal:							
Baol [1]	C	18	24	13	2	62	39
	D	8	12	11	2	48	11
Dakar [1]	C	-------	2	52	53	140	56
	D	-------	2	42	117	122	46
Louga [1]	C	-------	33	54	60	138	49
	D	-------	10	27	21	103	20
Thies [1]	C	3	12	21	52	54	20
	D	2	9	8	35	30	8
Tivaouane [1]	C	11	71	135	43	119	29
	D	8	38	69	28	70	24

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30	Sept. 6, 1930
Algeria:																		
Algiers	C	5	1	3						1				1		2		
Constantine	C						1				1							
Oran	C	1																
Arabia: Aden	C	3	1						1									
Bolivia: La Paz.[1]																		
British East Africa (see also table below):																		
Tanganyika	C	103	57	409	385	755	196	274	64	4		100	26	51				
	D	7	14	70	154	90	31	26	13	2		27	4					
British South Africa:																		
Northern Rhodesia	C	9	1	59														
	D		2	9														
Southern Rhodesia	C		66	155	75	1	3		1	12	18							
	D		1	13														
Canada:																		
Alberta	C	10	4							2	1	2	1					
Edmonton	C	4	3															
British Columbia—Vancouver	C	20	17	4	1	1			2	2	1	1	1	1		2		
Manitoba	C	4	4	10			4											
Ontario	C	100	77	82	14	10	13	10	3	5	6	10	8		5	4		
North Bay	C			1														
Ottawa	C	19	21	25	6		8	1	1	1	4	7	5	1	1		2	1
Toronto	C			4	2	1	1			1								
Quebec	C							4	3					2		1		
Montreal	C												7					
Saskatchewan	C	47	41	39		12	10			2		3				8		
Regina	C			4														
Ceylon: Angoda, Western Province	C		6															
	D		2															
China:																		
Canton	C	6	3		1													
	D	2	3															
Chungking	C		P	P	P			P	P	P	P	P	P					
Foochow	C		P	P		P		P		P		P		P				

Hong Kong	C	38	18	12	2	1	1			2								
	D	25	23	9	1		1	1		1								
Manchuria—																		
Harbin	C		1	20	4													
Kwantung—Dairen	C		2	3		11	5		8									
	D			4			1											
Nanking	C	P	P	P	P	P				P	P	P	P					
Shanghai—																		
Foreigners only	C	2	3	2	1	1	1	2	1	1	1	1	3					
Including natives	D	10	10	5	1		1	1										
Swatow	D	6	3	6	1		1	2	1				1			2		
Tientsin	C	2	2	1														
Chosen (see table below).																		
Colombia:																		
Barranquilla	C	2	1															
Buenaventura	C		15	4	1	1		4	4	3	2	1			1			
Costa Rica:																		
Port Limon	C		6	2	2													
San Jose [2]	C	10	7	2														
Curacao (alastrim)	C	14	2	2		1			2						1			
Dutch East Indies:																		
Borneo	C	185	90	16	2	10				2								
	D	12	31	1		1												
Java—																		
Batavia and West Java	C	78	64	12	1	4	6	2	3	1	3	1	1		1	2		
	D	6	11	7		1	2		2	1	1	1	1		1	2		
East Java and Madura	C		4								1							
Sanggi Islands	C	5	160	26							11							
	D	1	24	5							3							
Sumatra	C	48																
	D	5																
Egypt: Port Said	C		1	1						2		1						
Great Britain:																		
England and Wales	C	1,700	1,427	1,417	237	266	241	182	156	138	126	109	70	86	95			
Ashton under Lyne	C	15	18	17			3	4		4	2	2						
Bradford	C		3	2					1									
Cardiff	C	2	3						2									
Leeds	C	16	2						1									
London	C	710	602	637	130	136	125	107	84	52	62	48	36	50	41			
London and Great Towns	C	1,239	1,066	1,078	197	208	190	158	127	96	102	83	61	73	71			
	D	3	3															
Sheffield	C	8	2															
Stoke-on-Trent	C	122	85	62	3	10	15	4	3	2	1	3	1	1				
Scotland	C				1		3			1								
	D									1								
Honduras: Naco	C																	

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930, 7	June 14	June 21	June 28	July, 1930, 5	July 12	July 19	July 26	August, 1930, 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30	Sept. 6, 1930
India	C	39,329	34,843	22,835	3,686	3,550	3,174	2,552	2,258	2,006	1,853							
	D	9,109	6,983	5,451	1,065	913	905	648	733	580	577							
Bombay	C	718	430	218	36	35	23	19	17	15	11	7	6	2		2		
	D	431	270	161	27	23	19	10	13	9	9	2	5	2		2		
Calcutta	C	361	495	302	46	45	45	25	27	19	13	14	4		12	9		
	D	305	403	258	50	37	29	30	17	17	12	10	4		8	9		
Cochin	C	291	183	37	4	1	10	1			4	2	2	4	4	4	1	
	D	35	13	8	2	1	1											
Karachi	C	33	30	14	5		1	1				1	2		2			
	D	47	17	4	2		1						2		1			
Madras	C	173	133	72	9	10	8	8	6	10	17	16	19		9	10	9	
	D	36	27	15	6	3	1		4	1	3	4	3		5	3	1	
Moulmein	C	146	43	89		9	6	6	4	10	3	1				2	1	
	D	41	7	21		3	3	1	3	4	1	2				1		
Negapatam	C			1		1		1			1		2		2			
Rangoon	C	10	4	6	1	5	1	2	2	1	1		1	1				
	D	5		1			1	1										
Tuticorin	C			5			1											
Vizagapatam	C	69	6	5		1												
	D	18	2	3														
India (French):																		
Chandernagor	C	6	10	24	4	8	5	2	3	1	4							
	D	2	2	7			2	1	1	1	1							
Karikal	C	24	19	12	4	3	1	3	1		1			8		1		
	D	7	8	3	2	2	1	3	1		1			8		1		
Pondicherry Province	C	21	24	40	4	4	9	6	4	9	8	5	7	8				
	D	13	20	36	4	4	9	6	3	9	8	5	7	8				
India (Portuguese)	C	38	44	47		3	18	7	1				1					
	D	2	8	8		2	2	6				1	1					
Indo-China (see also table below):																		
Pnompenh	C			3							1							
	D		2		1						1				1			
Saigon and Cholon	C	3	5	3	1									1				
	D	1	5	2									1	1	1		1	

Iraq:																		
Baghdad	C		8	1	1				1	1	1				1			
	D		1	1							1				1			
Basra	C		1															
Mossoul Liwa	C		22	21		1		3	47	20								
	D		3	3		1			19	1								
Ivory Coast (see table below).																		
Jamaica (alastrim)	C			2														
Japan: Tokyo	C		1															
	D		1															
Macao	D	3	2	1														
Mexico (see also table below):																		
Jalisco (State) Guadalajara	D	22	20	7	4		5	6	3	1				1				
Juarez	C	2					6							2				
	D						1							1				
Mexico City and sourrounding territory	C	106	99	80	17	23	20	17	10	12	4	11	2	3	3			
	D	31	47	32	5	4	3	5	2	3	1	2	1	3	2			
Progreso	C			1														
	D			1			1											
Morocco (see table below).																		
Nigeria: Lagos	C	1	1					1										
Poland	C		7	3														
Portugal:																		
Lisbon	C	7	8	8	1		2	7		7		6		6	19	25	7	
Oporto	C															1		
Rumania	C	2																
Siam	C		8	2					2		4							
	D		4								3							
Somaliland, British: Boales	C	2																
	D	6																
Spain	C					4		8		1	1	3	2					
Straits Settlements	C	5	5	11	5		1	3	1	2	7	1	1	1	1	5	1	
	D	1	2	3	1		1		1	1	1				1	1		
Sudan (Anglo-Egyptian)	C	60	42	19	4	8	1	54	8	1		3				42	102	5
	D	5	4	2				3		1						3	50	2
Sudan (French) (see table below).																		
Switzerland: Berne Canton	C											1	1	1				
Syria (see table below).																		
Taiwan: Taihoku (see table below).																		
Tunisia: Tunis	C	3	4	2			2					1						
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P														
Orange Free State	C	P									P							
Transvaal	C	P																
Upper Volta	C	2	3	1			8	5										
Zanzibar	C	13																
On vessel:																		
S. S. Elysia, at Port Sudan, from Bombay	C		1															
S. S. Naldera, at Port Said	C			1														
S. S. Manoa, from Honolulu to San Francisco	C								1									

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		February, 1930	March, 1930	April, 1930	May, 1930 1-10	May, 1930 11-20	May, 1930 21-31	June, 1930 1-10	June, 1930 11-20	June, 1930 21-30	July, 1930 1-10	July, 1930 11-20	July, 1930 21-31	August, 1930 1-10	August, 1930 11-20
Indo-China (see also table above)	C	434	26	261	....	173	132	80	133	....	....	....	238	59	34
Ivory Coast	C	....	7	....	....	....	....	....	....	....	....	....	....	....	....
Sudan (French)	C	213	609	521	40	56	178	76	....	....	....	34	....	....	....
	D	11	49	36	7	7	18	18	....	....	....	....	....	....	....
Syria: Beirut	C	18	17	19	....	....	7	6	1	....	....	....	2	....	....
Taiwan: Taihoku	C	43	58	12	....	....	....	....	....	....	....	....	....	....	....

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
British East Africa (see also table above):							
Kenya	C	12	175	174	171	142	......
Uganda	C	109	....	....	78	......	......
	D	99	....	....	69	......	......
Chosen	C	263	236	253	107	......	......
	D	71	53	53	35	......	......
Seishin	C	4	....	5	2	......	......
	D	1	....	1	1	......	......

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
France	C	23	8	58	51	......	......
Mexico: Durango (see also table above)	D	6	5	4	4	3	3
Morocco	C	74	17	10	18	5	3
Turkey	C	114	....	3	16	......	......
	D	42	....	....	......	......	......

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30	Sept. 6, 1930
Algeria:																			
Algiers	C	4	6	8	15	2		1			1	2	3				2		
Constantine Department	C	5	11	15	6	11		1			1	1					3		
Oran	C				3				4		2	1			1				1
Arabia: Aden	C		1																
	D		1																
Bolivia: La Paz[1]																			
Brazil: Porto Alegre	C	2			1														
Bulgaria	C	13	9	15	6	1		9	6		4	5	1		1				
	D	1		1	2	1						1							
China (see also table below):																			
Manchuria—Harbin	C	1	4	52	13	3	3	2		2									
Shanghai	C		1												1				
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C			1				1	1	1						1			
Beheira Province	C	18	2	2	49	17	16	7	5		5	1	9						
	D	5			13	1	1		2		1		1						
Cairo	C	1												2			5		
Port Said	C	1															4		1
Great Britain: Scotland—																			
Dunfermline	C										1								
Glasgow	C				1														
	D				1														
Greece (see table below):																			
Iraq: Baghdad Liwa	C		2																

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 9–Mar. 8, 1930	Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30	Sept. 6, 1930
Ireland:																			
Irish Free State—																			
Galway County—Oughterard	C												2						
Kerry County—Dingle	C			5															
Leitrim County—Mohill	C								9				1						
Mayo County—																			
Ballina	C				2		1				1								
Castlebar	C																1		
Swinford	C				14														
Westport	C											2		1					
Roscommon County—																			
Roscommon	C											1							
Strokestown	C											1							
Wicklow County—Shillelagh	C						1		3	1		1							
Northern Ireland—Cookstown	C	3																	
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico: Mexico City, including municipalities in Federal District	C	9	4	4	6	2	3	1	3	2		2	1	2	2				
	D		1	4	3		1							1	1				
Morocco	C	21	38	15	11	1		6	8		4	3	4						
	D		7	3													8		
Palestine	C	1	6	1	2	2				3	1	1	1		1	1			
Poland	C	183	228	243	171	39	15	26	37		24		12	10	15	2			1
	D	8	13	15	5	3	3	2	3		4			1		1			
Portugal:																			
Lisbon	C			4															
Oporto	C	1	2	1												1			
Rumania	C	293	185	186	227		32	26											
	D	23	12	11	35		3	2											
Spain: Valencia	C						2		1		3								
	D										1								
Tunisia	C	3			6			2	16			14	10	2	5		3		

Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P			P	P	P	P	P							
Natal	C	3	P	P	P			P		P	P	P	1						
Orange Free State	C	P	P		P			P	P	P	P	P							
Transvaal	C			P															
Yugoslavia (see table below).																			

Place		January, 1930	February, 1930	March, 1930	April, 1930	May, 1930	June, 1930
China: Harbin (see also table above)	C			37	204	240	
Chosen: Seoul	C		17		3	43	
Czechoslovakia	C	10	2	42	29	12	1
Greece: Athens	C	12	6	3	1	3	3
Latvia	C	18				3	3
Lithuania	C	2	70	62	73	27	16
	D		5	4	4		
Turkey	C	2	3	1	3	16	2
Yugoslavia	C	26	33	46	22	16	6
	D	3	5	2	4	1	

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

X

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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CONFERENCE ON LEGITIMATE REQUIREMENTS OF NARCOTIC DRUGS, WASHINGTON, D. C., AUGUST 12, 1930

A SUMMARY OF THE PROCEEDINGS[1]

A conference of representatives of medical, dental, pharmaceutical, veterinarian, and other scientific associations and agencies with the Surgeon General of the United States Public Health Service was held in Washington, D. C., August 12, 1930, for the purpose of considering the question of (*a*) the necessity for and (*b*) the methods to be used in making studies and investigations for carrying out the provisions of the act approved June 14, 1930, relating to the quantities of crude opium, coca leaves, and their salts, derivatives and preparations, together with such reserves thereof as are necessary to supply the normal and emergency medicinal and scientific requirements of the United States. The proceedings of that conference are herein briefly reviewed and summarized.

The national organizations represented included the following:

American Dental Association.
American Drug Manufacturers Association.
American Hospital Association.
American Institute of Homeopathy.
American Medical Association.
American Medical Editor's and Authors' Association.
American Pharmaceutical Association.
American Veterinary Medical Association
Bureau of Social Hygiene (Inc.).
Committee on Drug Addictions.
National Medical Association.
National Research Council.
The Chemical Foundation (Inc.).
The National Association of Retail Druggists.
Bureau of Narcotics.
Department of Agriculture, Food, Drug, and Insecticide Administration.
Department of the Interior, Office of Indian Affairs.
Department of the Navy.
State Department.
United States Veterans' Bureau.
War Department.

[1] A full report of the entire proceedings of the conference will be published later.

The conference was opened at 10 a. m., recessed at 12.40 p. m., reconvened at 2.15 p. m., and adjourned at 4.05 p. m., deliberating a total of 4 hours and 30 minutes, under the chairmanship of Surgeon General Hugh S. Cumming.

At the opening of the conference it was explained that the Public Health Service assumed no regulatory functions respecting imports of crude opium or coca leaves, but was acting wholly in the capacity of scientific advisor to the Bureau of Narcotics with reference to the quantities of these drugs needed in the United States for medicinal and scientific purposes. It was also pointed out that the Surgeon General must decide whether or not it is necessary for the Public Health Service to undertake special studies and investigations to determine these needs, and the kind of program to be inaugurated, should special studies and investigations become necessary.

The methods of controlling imports, manufacture, sale, and distribution of narcotic drugs by the Federal Government were reviewed by Mr. Alfred Tennyson, legal adviser of the Bureau of Narcotics, who called attention to the regulation of imports of crude opium and coca leaves by a system of import certificates or permits, and to the regulation of the sale and distribution of narcotic drugs by a system of official order forms used by registrants with the Collector of Internal Revenue. Briefly, the scheme of control involves, first, the importer, the manufacturer, and the compounder, who must report each month to the central authority the quantity of all imports of crude opium and coca leaves, the quantity placed in process of manufacture, the quantity of drugs actually produced, the taxable goods sold, and the quantities furnished each customer; second, the wholesale dealer who sells in original, unbroken, stamped packages, and who submits to the central authority a monthly report of all transactions in narcotic drugs, giving information regarding the quantities received and sold, and to whom consigned. These dealers are called, for purposes of convenience, the producing and wholesale group, comprising class 1 and class 2 registrants under the narcotic laws.

The retailing and dispensing group must obtain their supply of narcotic drugs through the use of official order forms, must be registered with the Collector of Internal Revenue, and must make an annual report of drugs on hand to the central authority. They are not, however, required to submit a monthly return of the disposition of these drugs, such as is required of the class 1 and class 2 registrants. For purposes of convenience, the dispensing group comprises retail druggists or pharmacists, designated as class 3; the practitioners, embracing physicians, veterinary surgeons, and dentists, are grouped as class 4; and those who dispense the so-called exempt preparations containing opium or coca leaves or their derivatives are grouped as

class 5. During the course of discussion, attention was called to the use of a considerable quantity of opium or its derivatives in exempt preparations and that the quantities of opium so used had increased within recent years.

Mr. S. H. Breidenbach, statistician of the Bureau of Narcotics, opened the discussion on the subject of a statistical analysis of sales and distribution of narcotic drugs in the United States with special reference to medicinal requirements. He pointed out that the monthly reports rendered by the manufacturer of these drugs is very detailed and readily available for statistical study. Reports rendered by wholesale dealers are unsatisfactory for statistical analysis, because the kind of narcotic drug contained in preparations sold or purchased is not always stated, and, if stated, is not computed as to narcotic content, nor is the classification of data readily available for statistical analysis.

No reports are submitted to the Bureau of Narcotics respecting the disposition of narcotic drugs by the dispensing groups, embracing the pharmacist, practitioner, and dealer in exempt preparations. There are available, however, data showing the quantities of such drugs purchased by the dispensing group as a whole, but it is not classified in a way that would show the quantities purchased by pharmacists, by physicians or medical practitioners, by veterinarians, by dentists, or by those who deal in exempt preparations.

From the discussions which ensued, it appears that data on file in the Bureau of Narcotics are subject to further analysis and study with reference to the more specific requirements of the dispensing groups, but lack of personnel has made these studies impossible. The method of submitting annual invoices of drugs on hand by the dispensing groups does not lend itself to statistical analysis, however. An analysis of the manufacturers' reports has indicated an increasing amount of opium or its derivatives finding its way into exempt preparations, and a greater proportionate increase in the use of codeine or codeine salts. It is very probable that a larger quantity of opium than that formerly used in the manufacture of heroin has found its way into the manufacture of codeine.

Dr. E. F. Kelly, speaking for the American Pharmaceutical Association, opened the discussion on the specific question of "How important is the theoretical diversion of drugs from legitimate channels, and what rôle can a scientific study of dispensing methods play in determining the extent of such diversions?" An opinion was expressed by that association to the effect that a more nearly complete study and analysis of the information available to those charged with the enforcement of the narcotic law would furnish data respecting diversions of narcotic drugs from legitimate channels, and that such a method of study would be more advantageous than to attempt

a first-hand analysis of dispensing methods. Studies and investigations of infractions of the narcotic laws, and an analysis of diversions of drugs incident thereto, should be supplemental to the analysis of manufacturers' sales already referred to. Attention was called to the necessity for more detailed studies of the enforcement of one phase of the Federal narcotic laws dealing with the subject of exempt preparations with a view to developing greater supervision over the sale and distribution of such preparations.

The subject of exempt preparations was more fully discussed by Dr. R. L. Swain, representing the same association, who pointed out the need for stricter control, and the desirability of eliminating certain preparations and derivatives of opium from the exempt class so as to reduce the likelihood of their being used to satisfy addiction.

In a discussion of the specific question, "Is the present system of analyzing manufacturers' and wholesalers' sales adequate to establish a reasonable estimate of the medicinal and scientific needs of the United States respecting narcotic drugs?", Mr. Carson P. Frailey, executive vice president and secretary of the American Drug Manufacturers Association, requested the legal adviser of the Bureau of Narcotics to make suggestions as to how the present system of determining imports had functioned, and ventured the opinion that previous estimates, based upon an analysis of manufacturers' sales, have been reasonably accurate for the needs of the country without taking into account the necessity of reserves to meet emergencies.

Mr. Alfred Tennyson, in response to this question, considered that an analysis of manufacturers' sales and stocks on hand was a good criterion for determining the medical and legitimate needs, if one could assume a 100 per cent efficiency in enforcement of the narcotic laws. This, he pointed out, was all the more significant when consideration was given to the fact that all transfers of narcotic products down to the consuming classes must take place through official order forms, and that such forms can be obtained only by registrants presumably qualified to deal in narcotic products. Attention was called to the diversion of these drugs from legitimate channels to satisfy addiction.

The total amount of such diversion would be possible, but very difficult, to ascertain; but, even if known, it would be of questionable value in determining the amount necessary for importation because, should imports be reduced by an amount equal to the actual, or even theoretical, diversion, then imports would not meet the country's requirements, since diverting practices would still continue. On the other hand, should no diversion exist, or presuming that the narcotic law enforcement was sufficient to prevent all diversions, then the analysis of manufacturers' sales and stocks could be taken as a reliable criterion of the medicinal requirements.

Further discussion brought to light that an analysis of the monthly returns of purchases of narcotic drugs by the dispensing groups readily indicated which was being used in large or exorbitant quantities. These are subject to scrutiny and investigation to ascertain whether their use is questionable or illegal. The small force available to those charged with administering the narcotic laws makes it impossible to discover all irregular practices of this sort.

Subsequent discussions challenged the assumption that any considerable quantity of narcotic drugs was diverted from legitimate channels by the dispensing classes, and that such diversion was practically nil, if any, from the manufacturing, compounding, and wholesale groups.

Mr. J. K. Caldwell, of the State Department, who has had five years' experience as a member of the Federal Narcotics Control Board, commented upon the interpretation of "medical and scientific needs." Thus, if medical and scientific needs respecting narcotic drugs are to be interpreted as heretofore, manufacturers' sales are an adequate criterion for these needs. On the other hand, should these needs be interpreted as only the amounts used in good faith in the bona fide practice of the several professions using them, the quantity of such drugs diverted from legal channels should be subtracted from manufacturers' sales to arrive at an estimate of the country's needs.

In dealing with the specific inquiry as to the necessity for making studies and investigations respecting the quantities of narcotic drugs needed for medicinal and scientific purposes in the United States, the trend of discussion hinged upon an analysis of information now available to those charged with administering the narcotic laws, and that data on file in the Bureau of Narcotics was either subject to further study and investigation or could be collected and supplemented through that channel with less difficulty than by an independent survey undertaken directly by the United States Public Health Service.

Taking into account the present organization for law enforcement and the possibility of preventing diversions of narcotic drugs from legitimate channels with the machinery at hand, it was the tenor of the conference that the present system of analyzing manufacturers' sales offered, for the time being, a reasonable solution for determining the medicinal and scientific needs respecting narcotic drugs for the United States. With full appreciation of these results, the conference continued to discuss further items on the agenda.

At the afternoon session the principles involved in previous studies and investigations respecting medicinal needs were discussed by a representative of the State Department, the United States Public Health Service, and the committee on drug addictions. Mr. J. K.

Caldwell, representing the State Department, called attention to the interest of other governments in studies of this character, and stated that the problem of controlling the abuse of narcotic drugs was not only a domestic one but an international one as well. It was pointed out that The Hague Convention required Governments to limit the amount of manufacture of narcotic drugs to medicinal and legitimate purposes. Up to the present, no Government has undertaken a special study of these needs that would provide complete and adequate data, although an effort was made by the League of Nations to ascertain these needs by questionnaire sent to the various powers. Each Government answered in its own way, or not at all. In some instances the results obtained were largely based upon hospital uses and health insurance data; and in others on the formula of importation plus manufacture, minus exports, taking no account of diversions. As a result, inadequate information was available for the League of Nations conference of 1924.

The conference recently called by the League of Nations is faced with the problem of limiting the manufacture of narcotic drugs to medicinal and legitimate needs. Thus far the formula for the United States is "manufacture less exports."

Dr. G. W. McCoy, Director of the National Institute of Health, discussed the survey undertaken by the Public Health Service in Allegany County, Md., in 1924, to ascertain the narcotic requirements of a restricted area in order to obtain a reliable basis for computing the requirements of the country as a whole. The method of approach involved a personal canvass of every registrant legally authorized to deal in narcotic drugs, with the result that approximately 7 grains of opium and 29 grains of cocaine were the annual per capita requirements. These were the requirements of approximately 70,000 people, without any account being taken of the amount necessary to meet emergencies. These results included the so-called exempt preparations, which constituted about 4 per cent of the requirements of opium.

Dr. C. E. Terry, of New York, discussed the surveys undertaken under the auspices of the committee on drug addictions, of which he is executive secretary. Like the Public Health Service survey, the surveys of the committee on drug addictions were concerned with a detailed study of the legal narcotic uses, the technique employed being an analysis of the "record-keeping machinery," registrants' records required by the Federal narcotic laws.

The first surveys were undertaken in six communities of approximately 100,000 population each, widely scattered, and therefore embraced about 600,000 population. The per capita legal uses of narcotic drugs, expressed in opium equivalence, varied considerably for these six communities, ranging from 3.5 to 17 grains of opium. In

three the annual per capita legal use was 5, 6, and 7 grains of opium, respectively. In one it was between 13 and 14 grains. Because of the wide variations in per capita uses, an attempt was made to analyze further the data respecting these six communities. A more comprehensive analysis of "registrants' records" was undertaken in a large urban-suburban community with a population of approximately 1,625,000. The per capita legal use is represented by approximately 9 grains of opium. Data were also obtained by questionnaire of the legal use of these drugs in hospitals and institutions throughout the United States during the 12 months' period ending June 30, 1924. From these data there was obtained an average annual narcotic-drug requirement per hospital bed.

The communities surveyed by the committee on drug addictions represented approximately a total population of 2,200,000 persons, or about 2 per cent of the total population of the United States. Taking into account the results of an analysis of "registrants' records," as provided under the Federal narcotic law and the hospital uses, the per capita requirement represents approximately 8½ grains (8.56 grains) of opium per annum. This requirement does not take into account any quantities necessary to meet emergencies.

In the discussion which ensued, it was pointed out that the records of retail sales of exempt preparations were not satisfactory for analysis and it was necessary to return to the wholesale or manufacturers' sales figures for reliable data concerning these preparations. It was also shown that the importation of approximately 150,000 pounds of opium during the years 1926 and 1927 was almost parallel with the estimated requirements of approximately 8½ grains per capita.

Col. John D. McLean, of the American Hospital Association, opened the discussion upon the subject of the advisability of analyzing the records of general and special hospitals or institutions with reference to the indispensable uses, ill-advised uses, and diversions from legitimate channels of narcotic drugs as a basis for determining the normal medicinal and scientific requirements, and what official and unofficial agencies may be expected to furnish this information. As a preliminary to the discussion of this particular subject, Colonel McLean had undertaken a brief and cursory survey of the Philadelphia General Hospital at Philadelphia, Pa., which treats approximately 20,000 patients each year. This cursory survey showed that during the year 1927 the per capita patient requirement was 1.85 grains of morphine; in 1928, 1.5; and in 1929, 1.3. There has been a great increase in the amount of codeine used in the past several years. In 1929 each patient of the 20,000 treated averaged 7.5 grains of codeine. In 1928 the per capita was 6 grains of codeine. The survey with respect to the quantities of cocaine used indicated a per capita monthly requirement of 1 grain of cocaine.

Colonel McLean also analyzed a small tuberculosis hospital treating 793 patients during the year 1929. The per capita requirement was one-eightieth of a grain of morphine each day, and each patient received one-tenth of a grain of codeine each day. Diversions to illegitimate channels in these two hospitals is practically negligible, and attention was called to the necessity of preventing diversions in hospital practice. In further discussion Colonel McLean pointed out that a proper supervision of records available to those engaged in administering both Federal and State narcotic laws should give information complete enough to arrive at a definite conclusion as to the amounts of narcotic drugs that are required in this country. An analysis of the quantities of narcotic drugs legally used in a representative group of hospitals might serve as a basis for computing the annual requirements concerning the medicinal needs, however. Studies and investigations as to the uses of these drugs and the needs of the practicing physician probably constitute a very difficult problem. They might be made, however, by studies of the records of prescriptions issued and the quantities of narcotic drugs dispensed by groups of physicians attached to the hospitals surveyed.

Dr. A. C. Boylston, of the American Drug Manufacturers Association, brought up the question as to whether such studies and investigations were to be perpetual in character, and pointed out that ideas of physicians respecting the prescribing of narcotic drugs were constantly changing and called attention to the decrease in the quantity of morphine sold and a corresponding increase in the quantity of codeine sold. The increasing tendency to use codeine in lieu of morphine would affect materially the quantity of crude opium importations, because it requires approximately six times as much opium to provide a dose of codeine as it does to provide a dose of morphine.

There then ensued some discussion as to the addiction properties of codeine, and it was the sense of the conference that codeine in itself had either questionable or practically no addiction properties, and that probably it would be desirable to place as few restrictions as possible about its use. It was pointed out, however, that an individual having acquired tolerance to morphine may use codeine to satisfy addiction, although codeine would not be the drug of choice, a peculiar crossed tolerance being acquired.

Dr. William C. Woodward, representing the American Medical Association, sounded a word of caution that the conference should not leave the impression that there was no such thing as a codeine addict. Such addicts have been observed by reputable and competent physicians. The removal of restrictions from the use of codeine would render possible a traffic for illicit purposes.

In further discussion of the advisability of analyzing hospital records, Mr. S. L. Hilton, of the American Pharmaceutical Association, called attention to the necessity for control of narcotics in hospitals, and the desirability of their being under the supervision of one person and reported upon at regular intervals. Mr. Hilton, in discussing the advisability of analyzing prescription records on file in pharmacies, with reference to the indispensable uses, ill-advised uses, and diversions from legitimate channels, of narcotic drugs as a basis for determining the normal and scientific requirements, and what official and unofficial agencies may be expected to furnish this information, pointed out that there were some 50,000 to 55,000 pharmacists in the United States and it would be a monumental task to analyze the prescriptions in their files. He thought it possible, however, that certain State organizations might be willing to assist in determining exactly what was being done by retail pharmacists. In general, Mr. Hilton was of the opinion that there should be some analysis of prescriptions on file in pharmacies, with special reference to where and for what purpose excessive amounts of drugs are being prescribed and dispensed. This representation assumed the flavor of a regulatory function in an effort to stop illegitimate uses.

Colonel McLean, of the American Hospital Association, in discussing the question of analyzing pharmacists' records, pointed out that they were required to make monthly reports by local and State narcotic laws, and that those charged with administering the State narcotic laws, particularly in Pennsylvania, make close checks upon the prescriptions on file.

Dr. C. E. Terry reported some experiences resulting from the analysis of prescriptions on file, showing that a large number of drug addicts were being furnished supplies through the legal channels and that those who were border-line addicts were also receiving large quantities. He discussed some ill-advised uses of narcotic drugs, especially the placing of considerable quantities of morphine in the hands of inexperienced persons for self-medication, and the ill-advised combination of opium or its derivatives with other drugs and pointed out the danger of producing addiction through this ill-advised use. He thought that an analysis of pharmacists' records and physicians' and dispensing records was a most important matter, because of its possibilities in correcting the misuse of narcotic drugs by the medical profession. He pointed out, however, that any attempt seriously to interfere with the legal prescribing of opium or its derivatives might result in very great and undue hardships, that the present day prescribing of these drugs represented medical custom, and that any corrective measures must, of necessity, involve the question of medical education.

Proceeding with the other items on the agenda, discussion of the questions "The advisability of analyzing the records of dispensing physicians with reference to the indispensable uses, the ill-advised uses, and diversions from legitimate channels, of narcotic drugs * * *" and "The advisability of analyzing the records of pharmacists and dispensing physicians with reference to the indispensable uses, ill-advised uses, and diversions from legitimate channels of the so-called exempt preparations containing narcotic drugs, and what official and unofficial agencies may be expected to furnish these data," was opened by Dr. William C. Woodward, of the American Medical Association. Doctor Woodward thought that there would be no special difficulty in checking up the prescription records of practicing physicians, but that there would be, in different parts of the country, a considerable variation in customs and practices as to the use of these drugs, and that a variable norm would be the theoretical expectation. Because of this variability, he considered the problem a complicated one. He further pointed out that an analysis of methods of prescribing by physicians involves directly the activities of the machinery engaged in administering the narcotic laws, and that this machinery must take into account the question of individual judgment of physicians on the one hand and willful violation of the law, on the other hand.

Asst. Surg. Gen. R. C. Williams, of the United States Public Health Service, opened the discussion upon the advisability of utilizing morbidity and mortality reports and statistics as a basis for estimating the sickness expectancy rate for various types of illnesses and utilizing such data for arriving at the amount of narcotic drugs required for medicinal purposes. He called attention to the survey conducted by the Public Health Service of the sickness incidence in Washington County, Md., and of the sickness incidence of New York State, and stated that data of this sort might be utilized in computing the expectancy of narcotic drug needs, and that such data might be used in helping to determine the requirements of narcotic drugs to meet emergency needs incident to epidemics.

The next question on the agenda was "The advisability of undertaking an educational program on the indispensable uses of narcotic drugs and what official and unofficial agencies may be expected to contribute to such a program," and Dr. William Charles White, chairman of the drug committee of the National Research Council, was asked to comment upon this phase of the subject. In his discussion Doctor White drew a parallel to the educational campaigns that have been carried on, not only with reference to the drug-addiction situation, but with reference to tuberculosis, cancer, syphilis, and alcohol, without seeking a wider and broader program of prevention. He called attention to the work of the drug committee of the National

Research Council, which was faced with the problem of education and has come to the conclusion that the proper unit of education was through the physician and his clientele, and that any educational program to be effective must be carried on through the physician, out of which could grow the education of the public. Such an education must necessarily be in the hands of physicians. It appeared desirable to obtain a composite and authoritative cross-section opinion of the desirable uses of these drugs in the practice of medicine and in the treatment of specific types of illnesses. To meet such a need and to evolve informative memoranda which might be placed in the hands of practicing physicians, it was proposed that the cooperation of the American Medical Association, through its Council of Pharmacy and Chemistry, the drug committee of the National Research Council, the United States Public Health Service, and a group of representative members of the professions, be enlisted for the preparation of such memoranda. Progress has already been made in this direction through the Journal of the American Medical Association, which has accepted the task of revising articles written by individuals and passed upon by these various organizations which will be, eventually, available for utilization by the practicing physician and ultimately reflect itself in his clientele.

Further discussion indicated the desirability of replacing the present legitimate use of derivatives of opium and its preparations by some substance which might be expected to possess the physiological action of opium less its addiction properties. Such a situation has already developed in the medical and dental professions with reference to cocaine.

Dr. Mark Finley, representing the American Dental Association, emphasized the decreasing quantities of cocaine used by the dental profession and the desire of the American Dental Association to cooperate in every way possible to prevent the diversion of narcotic drugs from legitimate channels.

The comments of Mr. Robert P. Fischelis, representing the American Medical Editors' and Authors' Association, who is also secretary of the Board of Pharmacy of the State of New Jersey, called attention to the possibilities and the dangers of addiction to habit-forming drugs being caused through the use of so-called exempt preparations and to the work of the Board of Pharmacy of New Jersey in the matter of restricting the number of dealers in these exempt preparations. He mentioned also the cooperation obtained through those charged with the enforcement of the Federal narcotic laws. He pointed out, however, the necessity for an educational campaign for better control of the exempt preparations.

Prof. E. G. Eberle, editor of the American Pharmaceutical Journal, thought that the Pharmaceutical Association of Secretaries and the

law-enforcement officials having to do with pharmaceutical matters might be interested in an educational program.

Prof. Reid Hunt, of the Harvard Medical School, representing the National Research Council and the American Medical Association, called attention to the progress which has been made in the past 50 years in the evolution of drugs which have sedative and pain-relieving qualities, and the possibilities of finding some substitute for opium or its derivatives. The possibilities of substituting other drugs for opium or its derivatives was emphasized by Dr. William C. Woodward, of the American Medical Association, and by Capt. W. H. Bell, of the Navy Department.

Mr. Tennyson, of the Bureau of Narcotics, called attention to the desirability of carrying on an educational program in State and local jurisdictions with reference to the necessity for more uniform State laws and for carrying them into effect. These matters were further brought to the attention of the conference by provision of the act approved June 14, 1930, which authorizes the Treasury Department to cooperate with the several States in the suppression of the abuse of narcotic drugs in their respective jurisdictions.

The Surgeon General evinced an interest in the question of developing a substitute for opium or its derivatives, but pointed out that the evolution of such a synthetic, nonhabit-forming substitute was not germane to the questions before the conference.

Dr. C. Willard Camalier, of the American Dental Association, ventured the opinion that it might be practical to circularize the several registrants as to the quantities of drugs used by them, but mentioned the fact that most of this information would be on file in the Bureau of Narcotics for analysis.

Colonel McLean, representing the American Hospital Association, ventured the suggestion that the association might be requested to establish standards for the purpose of securing better control of narcotic drugs in all hospitals in the association. This was put in the form of a resolution recommending that more specific records be maintained by hospitals seeking to control narcotic drugs. It was seconded by Prof. E. G. Eberle, of the American Pharmaceutical Association, and unanimously carried.

The Surgeon General then called attention to a previous item appearing on the agenda concerning the advisability of analyzing prescription records on file in pharmacies, and Dr. C. E. Terry, of the committee on drug addictions, New York City, believed, from his experience, that no other method could be as valuable for determining the legitimate medical needs. At least it would determine the current medical uses, having no connection, of course, with whether such use be advised or ill advised. Such records, however, are those required for the control of narcotic drugs by Federal narcotic laws,

and only by an analysis and study of these records could one be expected to determine the quantities of these drugs needed. Doctor Terry offered a motion that the Public Health Service study the records, not only of pharmacists but of dispensing physicians, and that such a study should have for its object a determination of the present advised and ill-advised uses of opium and cocaine with the end in view of using this data as a basis for better medical education in the uses of these drugs.

Dr. E. F. Kelly, of the American Pharmaceutical Association, tendered the cooperation of that organization in any study of the records of pharmacists that the Public Health Service might wish to undertake. He called attention to the long record of the American Pharmaceutical Association, which has advocated since 1852 the drastic control of dangerous drugs. He referred to his discussion of the morning, however, when an opinion was expressed that the records which are available to those administering the Federal narcotic laws are probably all sufficient for purposes of analysis. He stated that such records may be supplemented through that particular channel, but that the Public Health Service was the proper agency for giving appropriate advice, and that the American Pharmaceutical Association tenders its offer of support.

Dr. William C. Woodward, of the American Medical Association, called attention to the fact that, while he was a member of the committee appointed by the American Medical Association to attend the conference, he had no authority to represent the views of that association, since the by-laws and constitution provided that the policies of the association could be made only by the house of delegates or, in the absence of the house of delegates, by the board of trustees. He said, however, that the Public Health Service could count upon his cooperation and the cooperation of the several groups represented at the conference. He suggested the appointment of one representative of each of the organizations present to study further the outcome of the conference.

Dr. William Charles White offered a resolution, as expressing the sense of the conference, that the United States Congress should provide funds for carrying out the functions of the agencies of the Government concerned with the problem under discussion. Mr. Carson P. Frailey seconded the resolution on behalf of the American Drug Manufacturers Association, but the Surgeon General expressed the belief that, when the question was placed before responsible officers of the Government and the Bureau of the Budget, sufficient funds would be made available for carrying on the functions. He expressed some embarrassment, as chairman, in putting a motion of this particular kind. Doctor White, therefore, asked that he be permitted to request a vote upon the resolution. This permission

was granted, and the resolution was unanimously agreed upon by the conference.

In closing the conference the Surgeon General expressed his personal appreciation, and the appreciation of those associated with him, for attendance at the conference and for the interest shown in the particular subject under discussion; and he expressed the hope that a smaller group, representing the several organizations present, might be assembled to discuss ways and means of carrying out what seemed to have been the general sense and tenor of the deliberations.

THE TRAINING OF HEALTH OFFICERS [1]

By JOSEPH W. MOUNTIN, *Surgeon, United States Public Health Service, Tennessee State Department of Health, Nashville, Tenn.*

INTRODUCTION

This paper is intended to cover very briefly certain aspects of the training of medical graduates for positions as local health officers. Although it is developed from a background of experience in county health work, it is felt that the principles and plan herein suggested may have more general application. This plan contemplates the setting up of a state-wide program embracing the establishment of educational standards, providing facilities for training, and enforcing certain requirements. What the content of the course should be is fairly obvious and has received considerable attention in discussions of this subject, but the administrative relationships are not so clear cut and seem to have been given little thought. The necessity of having trained health officers should be self-evident; yet, judging from experience in the field of public education, progress toward this end will be slow unless some State agency in administrative charge accepts the responsibility for its promotion and enforcement.

ORGANIZATION AND ADMINISTRATION

Theoretically, professional standards might be enforced by a system of licensing. Such a plan, however, is not likely to be productive of the best results until these standards are more clearly defined and apply to the higher as well as the lower positions in the State. The tendency at the present time seems to be away from licensing and toward basing the salary scale on qualifications. The latter method may be incorporated in the system of State aid. Irrespective of which plan is followed, if it is to succeed on a state-wide basis it must be administered by some central agency. The State health department seems to be the logical agency, and may serve four

[1] Read before the health officers' section of the American Public Health Association at the fifty-eighth annual meeting held at Minneapolis on October 3, 1929.

very necessary functions: (1) Develop an appreciation of the need for professional training; (2) assist in making arrangements for training; (3) provide facilities for field experience; and (4) insure the observance of professional standards. An appreciation of the need for professional training must be developed in the minds of both the workers and the employing agency. The workers must be made to feel a desire for professional advancement, and the employing agents must understand that they can not expect efficient service from persons who are not prepared for the positions. The State health department may assist in creating and organizing facilities for training, but more especially it should lend its aid in bringing about the use of training facilities. This may be accomplished by a system of licensing, or, better, by specifying qualifications of personnel in its plan of financial subsidy to local health organizations. Within certain limitations, this plan of subsidy might well be extended to include aid on a program for training the health officers.

BASIC TRAINING

In the main, four methods of training have been tried: (1) Experience, (2) training stations, (3) academic courses of varying duration, and (4) a combination or modification of the foregoing methods.

Experience.—Under this plan a physician becomes a health officer by being appointed to such a position. His future professional development is determined by his own efforts in a rather restricted environment. Certain States, while still pursuing this plan, have attempted to meet its well-known defects through consultation service from the central office.

Training station.—The general plan in developing a training station is to select a local health department in which high-grade health work is being performed. The trainee is thus afforded an opportunity to gain his experience rapidly under the supervision of the duly appointed and qualified health officer. It soon became apparent to most directors of training stations that the men coming for training were not profiting as they should. There seemed to be two causes: (1) The trainees did not have sufficient basic knowledge of the subject, and (2) the local health department could not absorb more than a few trainees without seriously interfering with its regular duties. As a consequence, training stations were forced to take on the added duty of instruction in fundamentals and were compelled to limit the number of trainees or increase the staff beyond the number required for the performance of the regular work of the department.

Academic courses.—For many years courses in public health of various types have been given under different auspices. They range from the so-called institute of a few days' duration to the full course leading to a degree of doctor of public health. Something more than

brief attendance at a health institute is necessary to prepare a person for a career in public health. On the other hand, it has not been possible as a general rule to induce doctors of public health to accept positions as directors of public health units in any but the more populous and wealthy counties.

Present needs.—Each of the foregoing methods has its merits as well as its weaknesses. The purely practical courses are deficient in that persons with little or no basic training have difficulty in acquiring experience in a short period of time. In the more formal courses there is a tendency to stress abstract sciences and neglect practice. What is needed is a plan of instruction which will combine the resources of teaching institutions and the facilities of administrative health agencies, and in which the fundamental sciences will be woven into a course which is essentially practical in character.

The question of auspices is one of importance. Most public health institutes and training stations are conducted by administrative health agencies. There is a growing tendency for health departments to attempt the training of employees by this method. If this practice continues, present academic standards will break down, and the back-door entrance to public health will be tacitly accepted on a respectable basis. If educational institutions are to retain their rightful positions in the training of health officers, they must recognize the practical needs of administrative health organizations and make the necessary adjustments. On the other hand, administrative health organizations must develop a proper attitude toward scholastic standards and correct methods of instruction required bv teaching institutions of recognized standing.

TENNESSEE PLAN

An experiment in training of health officers was begun in Tennessee in the spring of 1928. The course is organized in the department of preventive medicine of Vanderbilt University Medical School and is conducted jointly with the State department of health. In this manner the resources of a teaching institution are coordinated with a health department. The course occupies a period of 12 weeks. The first six weeks are devoted to the fundamental subjects and the last six weeks are spent in a county health department. The intramural instruction is conducted in the nature of round-table discussions and observation of methods pursued in the clinics and the divisions of the State department of health. During the period spent in a county the trainees actually enter into the routine work of the county health department. In doing so they follow a definite schedule, keep accurate notes, and periodically meet in conferences for the purpose of discussing the several activities.

A definite attempt is made to appraise the ability of the student by his performance in the field and the reactions he manifests at seminars which are held at intervals during the period of training. Throughout the course the trainee is made to feel that he has joined an organization and is learning the business. On the other hand, however, he is constantly aware of the fact that he is in training for a definite purpose. His record determines whether he will be employed and the type of position to which he will be appointed. The completion of this course or evidence of equivalent instruction and experience is a requirement of the State department of health for employment as director of a county health department in Tennessee.

Results.—Two classes of six members each have been organized. Two trainees resigned during the course, and one was dismissed because of lack of adaptability; nine completed the course. Eight of these are now employed in Tennessee. Their performance has been far above the average, and it seems reasonable to attribute their success in part at least to the training received under this plan. It is the intention of the department to begin another course in October of this year.

CONSULTATION SERVICE

No plan of training, unless it be prolonged unduly, will equip a health officer for every job he is called upon to perform. It is necessary for the State health department to maintain a staff of specialists in public health, such as sanitary engineers, statisticians, child hygienists, epidemiologists, etc., whose services will be available to the local health officer. While the primary function of these specialists is to assist the local health officer with his problems, this contact affords an excellent opportunity for the health officer to obtain expert instruction on the problems which are of special concern to him. In this manner, too, the State health department will be able to increase the usefulness of the local health officer to the community, and thereby place in the local department of health the responsibility for the solution of local problems.

SUBSEQUENT INSTRUCTION

In the smaller health organizations the motivating influence is very largely centered in the health officer, and, as a consequence, the program tends to become stereotyped and stale unless the health officer is afforded an opportunity to return periodically and learn of advances in science and improvements in practice. Such courses should be provided and should vary both in length and subject

matter in order to meet the needs of the health officer. However, they should be correlated in such a manner that when pieced together they embrace a comprehensive plan of instruction. When academic standards become such as to meet the requirements of the more formal and extensive courses, credit or some other recognition may be arranged.

EXTENDED COURSES

Encouragement should be given to persons seeking detailed information on special subjects, and to others who may wish to acquire a broad grasp of the whole field of public health. Persons desiring these types of instruction should enter the well-organized schools of hygiene or the research institutions, since training of this character is not contemplated in the plan outlined above except in so far as the State health department may assist State and local workers in availing themselves of such facilities.

SUMMARY

The administrative health officer should be trained for his work. This training should cover fundamentals and should afford an opportunity to acquire experience in the practical conduct of the work of a health department. A course of this type will necessitate a close coordination of a teaching institution and an administrative health organization. However, such training facilities are not likely to be used extensively unless a system is perfected which will provide means whereby training can be made readily available, and unless there be some provision for making training a qualification for employment and advancement. The State health department seems to be the agency best able to sponsor a plan of training; however, the actual teaching should be under the management of an educational institution such as a department of preventive medicine in a medical school or a school of hygiene. The local health agencies should cooperate, particularly for the purpose of making available their facilities for acquiring experience in practical public-health administration. An approach to the whole subject of training on a comprehensive basis was begun in Tennessee during the spring of 1928 under the joint auspices of the department of preventive medicine of Vanderbilt Medical School and the Tennessee State Department of Public Health. Experience up to the present time indicates that it will be successful in Tennessee. It should be possible to adopt this plan or certain modifications of it in any State if the State health department participates in local health service and can affiliate with a teaching institution which is in position to assume responsibility for the administration of the course as well as a major part of the actual teaching.

A NOTE ON THE "ZONE PHENOMENON" IN HUMAN SERA

A COMPARISON OF ANTITULARENSE WITH ANTIABORTUS SERA

By R. R. Spencer, *Surgeon, United States Public Health Service*

During a period of 18 months (November, 1928, to May, 1930) the National Institute of Health (formerly Hygienic Laboratory) has received 2,000 samples of human sera from various sections of the United States for diagnosis of undulant fever or tularaemia. There were 1,369 samples with a request for testing against *B. abortus* or *B. melitensis*, and 831 requests for testing against *B. tularense.* Many physicians requested that their samples be run against the antigens of both diseases. Therefore, as a routine procedure, and regardless of the specific request, each sample was tested for agglutinins against both *B. abortus* and *B. tularense.*

TECHNIQUE

The macroscopic agglutination test was employed throughout with a total volume of 1 c. c. in each tube of the dilution series. The turbidity of all antigens in the final dilutions was equivalent to a silica standard of 250. The symbol "4" represents 75 to 100 per cent agglutination; "3" represents 50 to 75 per cent agglutination; "2" represents 25 to 50 per cent agglutination; "1" represents 1 to 25 per cent agglutination; and "0" represents no agglutination. All tubes were incubated two hours at 37° C. and placed in the ice box for 18 hours before a reading was made.

We have not considered a serum as being positive or diagnostic unless the tubes containing a dilution of 1:80, or higher, showed definite flocculation.

RESULTS OF TESTS

Of the 2,000 human sera, 329 were positive against *B. tularense.* Sixty-five of these, or 19.7 per cent, showed a definite inhibition zone in one or more tubes. (Table 1.)

Of the 179 positive abortus sera, 54, or 30.1 per cent, showed a zone of inhibition. (Table 2.)

Table 1.—*The zone of inhibition as exhibited by 65 antitularense human sera from a total positive antitularense area of 334*

	Serum No.	Dilution									
		10	20	40	80	160	320	640	1,280	2,560	5,120
1	209	2	2	2	4	4	4	0	0	0	0
2	212	2	4	4	4	4	4	4	2	0	0
3	271	2	4	4	4	4	4	0	0	0	0
4	310	0	2	4	4	4	4	4	0	0	0
5	398	2	4	4	4	4	4	4	4	------	------
6	416	2	4	4	4	4	4	4	4	------	------
7	561	2	4	4	2	0	0	0	0	0	0
8	690	3	4	4	4	3	0	0	0	0	0
9	714	0	0	4	4	4	3	1	0	0	0
10	717	3	4	4	4	0	0	0	0	0	0
11	760	3	4	4	4	4	4	4	0	0	0
12	777	2	4	4	4	0	0	0	0	0	0
13	872	0	4	4	4	4	4	4	4	------	------
14	875	2	4	4	4	4	4	1	0	0	0
15	888	0	4	4	4	4	4	4	0	0	0
16	1206	0	0	2	4	4	4	4	4	4	4
17	1207	0	2	2	4	4	4	4	4	4	4
18	1264	0	4	4	4	4	2	0	0	0	0
19	1272	3	4	4	4	4	4	4	3	0	------
20	1294	1	2	3	4	4	1	0	0	0	------
21	1319	0	0	4	4	0	0	0	0	0	0
22	1318	3	4	4	4	3	0	0	0	------	------
23	1361	3	4	4	4	4	4	4	0	------	------
24	1394	3	4	4	4	4	4	0	0	------	------
25	1406	2	4	4	4	4	4	4	2	0	------
26	1407	1	4	4	4	4	4	4	1	------	------
27	1413	0	4	4	4	4	4	4	2	------	------
28	1443	2	4	3	1	0	0	0	0	------	------
29	1448	2	3	4	4	4	2	0	0	------	------
30	1449	2	3	4	4	0	0	0	0	------	------
31	1465	0	2	4	4	4	4	0	0	------	------
32	1473	3	4	4	4	4	4	2	0	------	------
33	1483	3	4	4	4	4	4	4	4	------	------
34	1489	2	4	4	4	4	4	3	0	------	------
35	1504	3	4	4	4	4	4	4	0	------	------
36	1507	0	4	4	4	4	4	2	0	------	------
37	1516	0	4	4	4	4	4	4	0	------	------
38	1544	0	4	4	4	4	4	0	0	------	------
39	1563	3	4	4	4	4	4	4	3	------	------
40	1564	3	4	4	4	4	4	4	4	2	0
41	1566	3	4	4	4	4	4	4	4	4	0
42	1567	2	4	4	2	0	0	0	0	------	------
43	1570	2	4	4	4	4	4	4	4	4	0
44	1571	3	4	4	4	0	0	0	0	------	------
45	1578	0	4	4	4	4	4	4	4	3	0
46	1581	0	4	4	4	4	4	4	0	------	------
47	1586	0	3	4	4	4	4	4	4	0	------
48	1587	0	4	4	4	4	4	4	4	4	------
49	1588	0	3	4	4	4	4	4	4	0	------
50	1590	0	0	0	2	2	0	0	0	------	------
51	1612	1	2	3	4	4	4	4	4	0	------
52	1627	3	4	4	4	4	4	4	2	0	------
53	1633	2	4	4	4	4	4	4	4	0	------
54	1649	0	4	4	4	4	4	4	3	------	------
55	1679	3	3	4	4	4	4	4	4	2	0
56	1769	0	4	4	4	4	3	0	0	------	------
57	1837	2	4	4	4	4	4	4	3	------	------
58	1872	3	4	4	4	4	0	0	0	------	------
59	1922	2	4	4	4	4	4	4	0	------	------
60	1944	3	4	4	4	4	4	0	0	------	------
61	2037	1	2	3	4	4	4	0	0	------	------
62	2047	2	4	4	4	4	4	2	0	------	------
63	2071	3	4	4	4	4	4	4	4	0	------
64	2087	2	4	4	4	4	4	0	0	------	------
65	2140	2	4	4	4	4	4	4	4	4	0

In the series of 54 antiabortus sera showing zones, there were 4 showing a middle zone (Nos. 6, 14, 24, and 46, in Table 2). On the other hand, not one of the 65 antitularense sera showing a zone produced a middle zone. Furthermore, in the antiabortus series the prezones were usually wider than in the antitularense series. For example, in the antiabortus series one sample (No. 18) showed pre-

zoning up to and including the 1 : 160 dilution; 6 showed zoning up to the 1 : 80 dilution; 19 showed it up to the 1 : 40 dilution; and 41 up to the 1 : 20 dilution. In contrast with this it may be seen that in the antitularense series no zoning occurred as far as the 1 : 160 or the 1 : 80 dilution, and only 7 showed zoning in a dilution of 1 : 40 and 16 in a dilution of 1 : 20.

TABLE 2.—*The zone of inhibition as shown by 54 antiabortus human sera from a total of 181 positive sera*

	Serum No.	Dilution										
		10	20	40	80	160	320	640	1,280	2,560	5,120	10,240
1	63	0	2	4	4	4	4	4	2	------	------	------
2	107	2	2	2	4	4	4	4	4	------	------	------
3	355	0	2	4	4	4	4	2	0	------	------	------
4	516	0	2	2	4	4	0	0	0	------	------	------
5	569	0	0	2	4	4	4	4	4	------	------	------
6	683	4	4	2	0	0	0	2	4	4	2	0
7	741	0	1	4	4	4	4	1	0	------	------	------
8	794	0	2	4	4	4	4	4	2	------	------	------
9	861	0	0	2	4	4	4	4	4	------	------	------
10	881	0	0	0	0	4	4	4	4	0	------	------
11	886	0	0	0	4	4	4	4	4	4	4	0
12	891	0	0	0	0	4	4	4	4	2	0	------
13	1015	0	1	4	4	4	3	0	0	------	------	------
14	1073	4	0	4	4	4	4	4	4	4	0	------
15	1080	0	0	4	4	4	4	4	2	0	------	------
16	1089	0	2	4	4	4	4	0	0	------	------	------
17	1119	2	3	4	4	2	1	0	0	------	------	------
18	1158	2	2	2	2	3	4	2	0	------	------	------
19	1171	0	0	2	4	4	4	0	0	------	------	------
20	1197	0	0	4	4	4	4	4	4	4	4	2
21	1200	0	0	3	4	4	4	4	4	4	4	0
22	1208	0	0	2	3	4	4	4	4	4	3	0
23	1215	0	0	3	4	4	4	2	0	------	------	------
24	1281	2	2	1	4	4	4	4	4	4	2	0
25	1288	3	3	4	4	4	4	4	2	------	------	------
26	1347	0	2	4	4	4	4	4	4	4	0	------
27	1376	3	3	4	4	4	4	4	2	------	------	------
28	1475	0	4	4	4	4	4	4	2	0	0	------
29	1514	3	4	4	2	0	0	0	0	------	------	------
30	1542	0	0	4	4	4	4	4	4	0	0	------
31	1549	3	4	4	4	4	4	4	3	------	------	------
32	1593	3	4	4	4	3	0	0	0	------	------	------
33	1600	3	4	4	4	4	4	4	4	2	0	------
34	1670	1	4	4	4	4	0	0	0	------	------	------
35	1681	3	3	4	4	4	4	4	3	------	------	------
36	1682	0	3	3	4	4	4	4	4	3	0	------
37	1759	0	0	4	4	4	3	0	0	------	------	------
38	1785	0	0	0	4	4	4	4	4	2	0	------
39	1790	2	2	3	3	4	3	0	0	------	------	------
40	1797	2	2	3	3	3	0	0	0	------	------	------
41	1832	1	4	4	4	3	1	0	0	------	------	------
42	1869	2	4	4	4	4	4	4	4	4	0	------
43	1892	1	2	3	3	0	0	0	0	------	------	------
44	1915	0	1	2	3	0	0	0	0	------	------	------
45	1933	0	0	3	4	3	0	0	0	------	------	------
46	1964	3	3	2	2	3	4	4	4	------	------	------
47	1966	3	4	4	4	1	0	0	0	------	------	------
48	1978	3	3	3	4	4	4	4	4	4	3	0
49	2012	0	0	0	3	4	4	1	0	------	------	------
50	2013	1	2	4	4	4	4	4	4	------	------	------
51	2019	2	3	4	1	0	0	0	0	------	------	------
52	2046	0	3	4	4	4	3	0	0	------	------	------
53	2079	3	3	4	4	4	4	4	4	3	1	0
54	2144	0	3	4	4	3	0	0	0	------	------	------

COMMENT

We have no explanation for the fact that the antiabortus series gave more and wider zones of inhibition, but these results suggest that there is a qualitative difference in the behavior of agglutinins induced by different antigens.

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES [1]

August 10–September 6, 1930

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized below. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of Disease."

Poliomyelitis.—During the current 4-week period, 1,269 cases of poliomyelitis were reported, as compared with 838 during the preceding four weeks and 410 for the same period last year. Stated otherwise, the current incidence is a little greater than three times the incidence for the corresponding period of last year. During the preceding period of this year, the incidence was slightly less than three times the incidence of the corresponding period of last year. Judged by this criterion, and it is to be emphasized that there are other standards of measuring epidemicity, the epidemic wave has risen slightly when allowance has been made for the expected seasonal rise.

An examination of specific regions shows that the picture varied widely from region to region. In the Mountain and Pacific groups of States, the incidence declined in the last two 4-week periods from 330 reported cases to 259; in the South Central groups (lower Mississippi Valley) the decline was from 190 reported cases to 141. The remaining groups, on the other hand, showed increases as follows: The North Atlantic group rose from 134 reported cases to 358; the East North Central (Great Lakes) group from 37 to 118; the West North Central group from 121 to 358; and the South Atlantic group from 29 to 35.

September or October seems normally to have the seasonal peak of the poliomyelitis incidence; and with the two sections already on the down grade it is perhaps reasonable to hope that a decline will soon be under way in most of the other sections of the country.

Meningococcus meningitis.—The reported incidence of meningococcus meningitis for the period under report was 333 cases, as compared with 321 for the preceding period. The incidence is below that of the corresponding period of 1929, when the reported cases numbered 374.

Scarlet fever.—The incidence of scarlet fever was somewhat below the average; the reported cases numbered 2,501, as against 2,895 for the same period last year.

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[1] From the Office of Statistical Investigations, United States Public Health Service. The numbers of States reporting for the various diseases are as follows: Typhoid fever, 41; poliomyelitis, 43; meningococcus meningitis, 42; smallpox, 42; measles, 38; diphtheria, 42; scarlet fever, 41; influenza, 31.

Smallpox.—During the spring smallpox ran considerably ahead of the average for the period during recent years, but it declined sharply during the warm weather. During the current 4-week period 520 cases were reported as against 570 for the same period last year, and 459 the year before.

Measles.—The current incidence of measles was relatively low, 2,016 cases being reported during the four weeks under consideration, which was slightly below the figures for the corresponding period during each of the last two years.

Influenza.—Influenza continued on its recent low level, with 365 cases reported. This is about one-fifth less than the 1929 figure for the period, and hardly one-fourth of the incidence for that period in 1928.

Diphtheria.—The incidence of diphtheria continues to be the lowest on record. The reported cases number 2,353, as against 3,260 for the same period last year.

Typhoid fever.—During the months preceding June of this year, the typhoid fever incidence had been at record low levels. During the last two 4-week periods, however, the reported incidence rose, being 2,928 cases and 3,357 cases, respectively, as against 2,630 and 2,684 cases for the corresponding periods last year.

Mortality, all causes.—According to data from the Health Index of the Bureau of the Census the mortality from all causes during the current period was 10 per thousand population—annual basis. Last year the rate was slightly higher, averaging 10.8.

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for July, 1930

The accompanying table, taken from the Statistical Bulletin for August, 1930, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for July, 1930, as compared with that for the preceding month and for the corresponding month of last year. It also gives the cumulative rates for the period January–July for the years 1930 and 1929. These rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada.

The Bulletin states:

Although the July death rate among American and Canadian wage-earners and their families was a little above the average for that month, the cumulative mortality rate for the seven elapsed months of 1930 showed a marked reduction as compared with last year. For policyholders living west of the Rocky Mountains, the July death rate was 6 per thousand, as compared with 6.8 last year; in the rest of the United States, the 1930 figure was 8.6, as compared with 8.5, and in Canada, 8.2 against 7.8. In all sections of both countries the cumulative

death rate for the January–July period was well below that for the like part of last year.

In spite of the slight setback in July, there is still excellent prospect that the completed year 1930 will register the lowest death rate of all time, not only among the wage-earning populations of the United States and Canada, but among the population at large. There has been no widespread prevalence of any infectious or contagious disease; and all of the diseases which are the more sensitive indices of the state of the public health are recording death rates well below the average. The cumulative mortality for the group of four principal epidemic diseases of childhood, for example, is only 18.7 per 100,000, as compared with 23.3 for the like period of 1929. This marks a decline of 20 per cent in a single year. Only eight years ago (at this time of the year) the death rate for diphtheria alone was about the same as the combined rates, in 1930, for diphtheria, measles, scarlet fever and whooping cough. The diphtheria death rate for the January–July period (6.7 per hundred thousand) marks a reduction of 28 per cent from that for the like period of 1929.

The 1930 mortality record for tuberculosis becomes more and more favorable. The reduction in the death rate for all forms of tuberculous disease, up to the end of July, was 9.1 per cent; for tuberculosis of the respiratory system alone, it was 10.9 per cent. Last year we were not able to announce until December the certainty that the 1929 mortality rate for tuberculosis would be the lowest ever recorded up to that time in the United States. This year the gain has been so much more pronounced that, on the basis of only seven months' data, it has become a certainty that 1930 will register a new minimum for tuberculosis; and there is a strong probability that the largest year-to-year drop of all time will be accomplished.

There are still other noteworthy items in the health record of 1930. The influenza death rate is approximately 30 per cent of last year's figure, and that for pneumonia has dropped sharply. The mortality from the principal "degenerative" conditions has declined; deaths from diabetes, which have been increasing persistently in recent years, have been less numerous in 1930. Even the cancer death rate is running slightly below that for 1929, after showing an almost unbroken rise over a long period of years. The mortality rate for diseases incidental to pregnancy and childbirth is 12.4 per cent below the figure for the corresponding part of 1929. A new low point for these diseases will be reached in 1930.

Death rates (annual basis) per 100,000 for principal causes of death, July, 1930

[Industrial department, Metropolitan Life Insurance Co.]

Cause of death	Rate per 100,000 lives exposed*				
	July, 1930	June, 1930	July, 1929	Cumulative, January-July	
				1930	1929
Total, all causes	843.7	832.5	838.3	912.6	1,019.9
Typhoid fever	2.6	1.9	3.3	1.5	1.9
Measles	2.3	5.5	2.7	4.3	4.3
Scarlet fever	1.8	2.1	2.4	3.1	3.3
Whooping cough	4.9	3.9	5.9	4.6	6.4
Diphtheria	4.3	3.6	6.6	6.7	9.3
Influenza	4.2	7.9	5.3	18.7	63.5
Tuberculosis (all forms)	85.0	82.8	88.6	85.5	94.1
Tuberculosis of respiratory system	74.4	71.9	77.3	74.2	83.3
Cancer	79.3	76.1	80.0	76.5	78.2
Diabetes mellitus	16.7	15.6	15.7	19.2	20.2
Cerebral hemorrhage	60.2	57.6	†54.2	61.9	†61.2
Organic diseases of heart	133.7	139.6	125.9	153.2	160.3
Pneumonia (all forms)	39.2	58.4	40.0	92.5	113.7
Other respiratory diseases	10.2	11.8	8.5	12.2	13.7
Diarrhea and enteritis	22.9	15.9	20.8	14.0	15.3
Bright's disease (chronic nephritis)	66.9	69.9	63.6	70.5	73.8
Puerperal state	11.4	12.0	14.7	12.7	14.5
Suicides	9.3	9.9	8.1	9.6	8.8
Homicides	7.8	4.9	6.2	6.5	6.3
Other external causes (excluding suicides and homicides)	80.1	61.9	80.6	60.6	62.8
Traumatism by automobiles	22.2	20.1	23.1	18.8	18.0
All other causes	200.9	191.3	205.2	198.9	208.2

*All figures in this table include insured infants under 1 year of age. The rates for 1930 are subject to slight correction, as they are based on provisional estimates of lives exposed to risk.
†Rate not comparable with that for 1930.

COURT DECISION RELATING TO PUBLIC HEALTH

Establishment of tuberculosis hospitals in towns.—(New York Supreme Court, Appellate Division; Jewish Consumptives' Relief Soc. *v.* Town of Woodbury et al., 243 N. Y. S. 686; decided June 23, 1930.) Under the public health law it was necessary, when a person, association, corporation, or municipality proposed to establish a tuberculosis hospital in a town, to file with the State health commissioner a petition containing certain prescribed information and requesting a hearing. The commissioner and the local health officer were constituted a board to approve or disapprove the establishment of such hospital and the location thereof. In the event of a disagreement, provision was made for referring the matter to another board consisting of three designated State officials.

The plaintiff corporation sought to establish a tuberculosis hospital in the town of Woodbury. The State health commissioner and the local health officer, acting as a board as provided by statute, disagreed. The matter was referred to the other board provided for such a contingency, and said board approved the plaintiff's petition and granted permission for the establishment of a tuberculosis hospital on the site described, but upon the condition that said permission should

not be effective if the establishment of the hospital on such site was prohibited by any statute of the State or valid town ordinance.

Other portions of the public health law declared that tuberculosis was an infectious and communicable disease, dangerous to the public health, and imposed requirements as to reports of cases, sputum examination, disinfection, etc.

Certain sections of the town law authorized towns to adopt zoning ordinances, the law stating that the power given was "For the purpose of promoting the health, safety, morals, or the general welfare of the community." The law provided for districts, and within such districts the town could regulate and restrict the erection, construction, reconstruction, alteration, or use of buildings, structures, or land. Neither in that part of the town law dealing with zoning nor in any other part of the town law were hospitals referred to. Under the town law a town had power to provide ordinances of various kinds, including ordinances for the protection of property, the preservation of peace and good order, the preservation of health, etc.

The town of Woodbury adopted a zoning ordinance, one section of which read as follows:

> No hospitals or sanatoria for the treatment of either contagious or noncontagious diseases, dispensaries or correctional institutions shall be established, built, or maintained in either district No. 1 or district No. 2 or district No. 3 or district No. 4, and no hospitals for the treatment of contagious diseases or tuberculosis shall be established, built, or maintained in district No. 5.

The plaintiff's property was in districts Nos. 1 and 5. The use in district No. 1 was limited to residences, while the use in district No. 5 was not limited except as shown by the above-quoted section of the ordinance.

The plaintiff brought suit to enjoin the enforcement of the zoning ordinance. The trial court dismissed the complaint and plaintiff appealed. The appellate court stated the question thus:

> Does the town zoning statute override the public health law provisions in whole or in part? The State has declared that tuberculosis institutions may be established in towns. Do the zoning laws permit the town to prohibit that which the public health law permits? The State has declared a policy by virtue of the public health law. Have the zoning laws worked a repeal thereof so far as towns are concerned?

The judgment of the trial court was reversed by the appellate court, which directed judgment for the plaintiff for the relief demanded. In the course of its opinion, the court said:

> * * * The towns of the State of New York have only such powers as are conferred by statute. [Case cited.] The authority of a municipality to abrogate State law is never implied or inferred. It is only derived from express grant, never from a general grant of power. A State policy may not be ignored by a municipality unless it is specifically empowered so to do in terms clear and explicit.

[Citations.] The power to adopt zoning regulations under article 17-C of the town law is a general grant of power for the purpose of promoting the health, safety, and morals or the general welfare of the community, and permitting ordinances to regulate and restrict, among other things, the location and use of buildings, structures, and land for trade, industry, residence, or other purposes. It does not override the general law in so far as tuberculosis is concerned. A public policy so clearly stated by the legislature may not be lightly thrust aside. Even if this power to restrict could be construed to cover a particular use which is authorized by general law, such construction will not be made in the absence of express words to that effect or in the use of language which clearly and unequivocally shows an intent of the legislature to have it made.

Upon this basis, the town of Woodbury had no authority by ordinance to prohibit an establishment for the care of those afflicted with tuberculosis. While this ordinance does not in terms so prohibit, that is the effect of it. * * *

* * * Of course, if the State adopts a valid law upon a given subject, and the legislature sees fit to give the municipality a power to the contrary, the latter supersedes the former. This is not such a case, because the power to enact ordinances for the benefit of the public health, and these zoning regulations, can not be said to be in abrogation of the State's policy as indicated by the public health law. It must be borne in mind that an ordinance has the same force as legislation [case cited], and it requires clear language in a city charter or in the act giving powers to a town indicative of an intent to repeal the general law, before such an intent will be inferred. * * *

The court then considered the question as to whether the town, although it had no right to exclude tuberculosis hospitals, had the power to limit the places where such hospitals could be established, provided the zoning regulations were reasonable and for the welfare of the town. Answering this question, the court said:

* * * However, in the face of the specific grant to State authorities under the public health law, it should not be held that the general grant under the town law is sufficient to give the town power to exclude such institutions from any part of the town. [Case cited.] The towns had no such power immediately before the town zoning statute was enacted. In the absence of clear expression of intent on the part of the legislature so to do, it should not be held that the public health law was even to this extent repealed or modified. * * *

DEATHS DURING WEEK ENDED SEPTEMBER 13, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended September 13, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Sept. 13, 1930	Corresponding week, 1929
Policies in force	75, 388, 681	74, 676, 551
Number of death claims	12, 760	12, 725
Death claims per 1,000 policies in force, annual rate	8. 8	8. 9

Deaths [1] *from all causes in certain large cities of the United States during the week ended September 13, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Sept. 13, 1930				Corresponding week 1929		Death rate [2] for first 37 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (78 cities)	6,451	9.7	693	[4] 55	10.0	708	12.2	13.0
Akron	27	5.5	7	65	9.1	11	8.0	9.6
Albany [5]	23	9.4	1	21	16.5	8	15.1	16.5
Atlanta	67	13.0	7	72	19.7	17	16.2	16.3
White	26		4	63		9		
Colored	41	(6)	3	86	(6)	8	(6)	(6)
Baltimore [5]	154	10.0	15	52	10.3	19	14.2	15.0
White	116		9	40		17		
Colored	38	(6)	6	96	(6)	2	(6)	(6)
Birmingham	37	7.4	3	29	11.6	10	14.0	16.7
White	17		3	48		3		
Colored	20	(6)	0	0	(6)	7	(6)	(6)
Boston	166	11.0	20	58	10.5	17	14.2	15.6
Bridgeport	24	8.5	2	34	11.0	5	11.3	12.5
Buffalo	126	11.4	14	62	10.3	8	13.2	14.4
Cambridge	17	7.8	1	20	6.9	2	11.8	12.9
Camden	22	9.8	4	70	14.2	8	14.0	14.8
Canton	18	8.9	1	27	6.5	3	10.2	11.5
Chicago [5]	567	8.7	55	49	9.0	60	10.5	11.5
Cincinnati	123	14.2	14	82	13.0	12	15.8	17.4
Cleveland	155	8.9	12	36	9.9	17	11.3	12.9
Columbus	57	10.2	5	49	13.5	5	15.9	15.2
Dallas	42	8.3	4		8.4	6	11.8	11.9
White	28		3			5		
Colored	14	(6)	1		(6)	1	(6)	(6)
Dayton	45	11.7	5	75	10.1	5	10.6	11.6
Denver	81	14.6	19	207	10.8	7	15.0	15.1
Des Moines	31	11.3	5	92	14.0	2	12.0	11.9
Detroit	233	7.7	28	43	8.9	45	9.5	11.5
Duluth	21	10.8	2	54	5.7	0	11.3	11.6
El Paso	27	13.7	5		13.0	4	18.0	20.4
Erie	17	7.6	3	66	10.9	2	11.4	12.7
Fall River [5] [7]	21	9.6	2	46	5.9	4	12.2	14.3
Flint	23	7.6	5	59	6.9	3	9.3	10.7
Fort Worth	34	11.0	11		8.2	3	11.3	12.9
White	24		2			3		
Colored	10	(6)	9		(6)	0	(6)	(6)
Grand Rapids	24	7.4	2	30	9.1	5	10.4	10.3
Houston	62	11.1	9		12.3	8	12.4	13.0
White	47		9			7		
Colored	15	(6)	0		(6)	1	(6)	(6)
Indianapolis	85	12.1	12	90	10.3	7	14.9	15.0
White	74		9	78		5		
Colored	11	(6)	3	175	(6)	2	(6)	(6)
Jersey City	44	7.3	6	52	9.3	9	11.5	12.8
Kansas City, Kans	27	11.5	3	70	5.6	1	11.6	13.6
White	25		3	83		1		
Colored	2	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo	105	13.9	11	92	11.6	11	13.7	14.3
Knoxville	32	15.7	5	117	18.1	2	14.1	14.0
White	29		5	130		1		
Colored	3	(6)	0	0	(6)	1	(6)	(6)
Los Angeles	232	9.7	21	63	9.0	22	11.2	11.6
Louisville	67	11.2	13	111	9.5	8	13.9	15.3
White	47		9	89		7		
Colored	20	(6)	4	265	(6)	1	(6)	(6)
Lowell [7]	18	9.4	0	0	10.3	1	13.7	14.6
Lynn	17	8.7	2	56	10.2	1	10.7	11.6
Memphis	89	18.3	12	141	19.4	10	17.8	19.6
White	51		9	163		4		
Colored	38	(6)	3	101	(6)	6	(6)	(6)
Milwaukee	87	7.9	9	39	8.8	11	9.9	11.3
Minneapolis	90	10.1	7	46	8.8	5	10.8	11.1

Footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended September 13, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*—Continued

City	Week ended Sept. 13, 1930				Corresponding week 1929		Death rate[2] for first 37 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1930	1929
Nashville	42	14.9	4	63	10.0	4	12.7	19.4
White	23	------	3	63	------	2	------	------
Colored	19	(6)	1	62	(6)	2	(6)	(6)
New Bedford[7]	18	8.3	0	0	3.7	1	11.0	12.7
New Haven	33	10.6	0	0	9.6	1	13.1	13.6
New Orleans	125	14.2	5	28	14.6	14	17.8	18.0
White	81	------	4	34	------	4	------	------
Colored	44	(6)	1	16	(6)	10	(6)	(6)
New York	1,133	8.4	108	45	8.6	116	11.0	11.6
Bronx Borough	169	6.9	9	26	5.9	9	8.1	8.4
Brooklyn Borough	378	7.6	49	51	7.7	42	9.9	10.5
Manhattan Borough	423	11.9	40	51	12.2	51	16.5	16.9
Queens Borough	123	5.9	8	32	6.6	11	7.2	7.8
Richmond Borough	40	13.2	2	39	14.2	3	14.8	16.2
Newark, N. J	74	8.7	6	31	8.7	16	12.2	13.1
Oakland	60	10.9	9	112	9.9	3	11.1	11.6
Oklahoma City	43	12.1	8	144	12.4	8	10.9	10.9
Omaha	32	7.8	2	24	10.1	2	13.7	14.0
Paterson	17	6.4	4	70	14.3	3	12.5	13.7
Philadelphia	393	10.4	53	79	11.2	32	12.7	13.5
Pittsburgh	143	11.1	19	67	12.6	15	14.0	15.1
Portland, Oreg	51	8.9	1	12	8.8	2	12.4	13.0
Providence	51	10.6	4	37	12.7	8	13.3	15.0
Richmond	35	10.0	6	87	12.3	2	15.1	16.6
White	15	------	2	44	------	1	------	------
Colored	20	(6)	4	171	(6)	1	(6)	(6)
Rochester	43	6.9	8	71	9.7	4	11.7	12.8
St. Louis	167	10.6	10	35	9.7	10	14.5	15.0
St. Paul	56	10.7	5	51	7.4	3	10.3	10.7
Salt Lake City[5]	17	6.3	2	32	10.9	7	12.5	13.2
San Antonio	54	11.0	7	------	9.3	6	15.6	15.0
San Diego	41	14.3	2	42	8.4	1	14.6	15.4
San Francisco	164	13.6	10	68	11.8	4	13.3	13.4
Schenectady	10	5.4	1	31	7.7	4	11.3	12.7
Seattle	75	10.7	2	20	8.0	1	11.1	11.2
Somerville	15	7.5	2	63	7.6	1	9.9	9.4
Spokane	31	14.0	5	130	11.8	2	12.5	13.1
Springfield, Mass	25	8.7	1	17	10.9	1	12.3	13.0
Syracuse	31	7.8	6	74	10.7	1	11.9	13.6
Tacoma	21	10.2	1	27	9.8	1	12.7	11.9
Toledo	57	10.2	7	64	11.9	10	12.7	13.9
Trenton	30	12.7	8	154	13.2	7	17.0	17.4
Utica	29	14.7	1	28	12.8	2	15.0	15.7
Washington, D. C	96	10.3	11	64	11.1	15	15.4	15.7
White	61	------	4	35	------	7	------	------
Colored	35	(6)	7	125	(6)	8	(6)	(6)
Waterbury	16	8.2	2	49	6.8	4	9.9	9.7
Wilmington, Del.[7]	18	8.9	1	24	16.8	4	14.7	14.3
Worcester	25	6.6	1	14	9.4	5	12.9	12.9
Yonkers	13	5.0	2	48	10.2	2	8.1	9.5
Youngstown	30	9.2	7	100	15.0	2	10.2	12.5

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended September 20, 1930, and September 21, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 20, 1930, and September 21, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929
New England States:								
Maine	4	2			90	6	0	0
New Hampshire	7	3			1		0	0
Vermont					1	8	0	0
Massachusetts	38	48			17	20	3	3
Rhode Island	5	4		1	3	1	0	0
Connecticut	3	18	3	1	3	4	0	0
Middle Atlantic States:								
New York	54	78	[1] 5	[1] 6	42	46	8	12
New Jersey	38	69	1	1	14	8	4	5
Pennsylvania	80	73			45	45	5	4
East North Central States:								
Ohio	19	23	7	3	12	46	0	0
Indiana	23	15			4	5	5	3
Illinois	101	114	8	19	9	19	4	5
Michigan	36	75	1	1	19	50	12	14
Wisconsin	4	17	15	22	18	34	0	0
West North Central States:								
Minnesota	10	12	2		2	4	0	0
Iowa	6	5			6	2	1	0
Missouri	15	22	1	3	10	7	2	6
North Dakota	4	5				5	0	1
South Dakota	6	3	2				0	0
Nebraska	6	5	2		15	6	3	0
Kansas	6	21	2		4	18	2	4
South Atlantic States:								
Delaware					1	1	0	0
Maryland [2]	7	14	2	3	3	2	0	0
District of Columbia	8	7			7	1	0	0
Virginia								
West Virginia	25	16	1	7	10	1	0	0
North Carolina	81	211	8		1	5	2	1
South Carolina	41	54	186				0	0
Georgia	18	39	11	16	26	4	1	3
Florida	5	20		1	2	1	0	0

[1] New York City only. [2] Week ended Friday.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 20, 1930, and September 21, 1929*—Continued**

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929
East South Central States:								
Kentucky							0	1
Tennessee	22	17	2	36	7	2	2	0
Alabama	26	63	4	7	5	5	1	1
Mississippi	15	57					0	1
West South Central States:								
Arkansas	8	7	2	4		4	1	1
Louisiana	18	24	1		1	16	0	1
Oklahoma [2]	19	48	7	20	1	6	0	0
Texas	11	30	3	19	2	1	0	0
Mountain States:								
Montana		4			1	5	0	2
Idaho		2			2	2	0	1
Wyoming	1					1	0	2
Colorado	6	7			2	2	1	0
New Mexico	4	5			3		1	0
Arizona	8		1		4	2	2	0
Utah [2]		2	8			1	3	2
Pacific States:								
Washington	4	6			6	2	1	11
Oregon	1	3	7	5	23	3	0	1
California	16	37	11	10	41	32	3	6

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929
New England States:								
Maine	18	1	9	12	0	0	6	2
New Hampshire	3	1	1	5	0	0	2	0
Vermont	0	5	1	9	0	0	0	0
Massachusetts	26	3	59	63	0	0	12	12
Rhode Island	6	0	4	4	0	0	3	2
Connecticut	8	0	17	9	0	0	0	25
Middle Atlantic States:								
New York	61	33	69	70	0	3	31	39
New Jersey	2	3	37	34	0	0	6	13
Pennsylvania	12	12	101	75	0	0	84	42
East North Central States:								
Ohio	42	5	62	62	15	20	44	32
Indiana	13	0	44	30	16	19	15	12
Illinois	27	4	92	177	18	17	46	32
Michigan	13	13	70	89	7	19	47	10
Wisconsin	8	1	32	38	5	9	11	6
West North Central States:								
Minnesota	18	1	26	57	1	2	4	4
Iowa	18	5	13	18	4	4	5	10
Missouri	14	0	14	39	1	24	28	15
North Dakota	3	1	3	4	0	1	7	4
South Dakota	3	0	3		2	0	4	1
Nebraska	22	0	12	13	13	1	1	0
Kansas	65	1	32	35	3	6	9	11
South Atlantic States:								
Delaware	1	0	4		0	0	3	4
Maryland [1]	1	0	11	30	0	0	50	19
District of Columbia	0	0	3	3	0	0	4	2
Virginia		10						
West Virginia	1	2	21	44	6	5	51	48
North Carolina	1	4	65	105	1	9	33	27
South Carolina	2	3	18	21	0	1	49	30
Georgia	3	0	11	18	0	0	32	44
Florida	0	0	2	4	0	0	4	2

[1] Week ended Friday.
[2] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 20, 1930, and September 21, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929	Week ended Sept. 20, 1930	Week ended Sept. 21, 1929
East South Central States:								
Kentucky	0	0	25	14	2	0	37	15
Tennessee	1	1	23	33	1	0	37	41
Alabama	1	3	27	36	9	0	49	38
Mississippi	2	0	8	21	2	0	28	25
West South Central States:								
Arkansas	1	0	7	10	4	0	28	26
Louisiana	8	0	13	16	2	0	34	10
Oklahoma [3]	6	2	8	24	4	2	40	37
Texas	5	0	6	13	2	3	20	20
Mountain States:								
Montana	1	0	7	7	0	5	7	46
Idaho	1	0	2	6	0	3	1	3
Wyoming	12	0	2		0	0	1	0
Colorado	7	0	7	10	1	2	10	5
New Mexico	0	1	2	3	0	3	21	15
Arizona	1	0	4		0	0	11	2
Utah [2]	0	3	2	7	0	2	0	3
Pacific States:								
Washington	0	1	29	21	6	7	1	9
Oregon	0	3	8	5	0	2	4	4
California	66	5	34	71	3	22	20	7

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Cerebrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August, 1930										
Colorado	5	28		1	65		13	34	4	47
Idaho	3	7	1		13		2	8	8	4
Illinois	27	258	13	89	75	1	58	235	79	167
Louisiana	5	41	24	88	20	48	69	23	0	153
Maryland	2	41	13	3	18		8	34	0	240
Minnesota	10	48	8		19		80	59	11	27
New York	58	237		16	603		182	231	1	113
North Carolina	6	244	2		16	658	13	136	11	238
Ohio	16	101	27	19	97		100	231	42	199
West Virginia		44	10		43		5	58	19	245
Wisconsin	15	51	54		255		17	108	23	32

August, 1930

	Cases
Anthrax:	
Colorado	1
Louisiana	2
Chicken pox:	
Idaho	11
Illinois	100
Louisiana	1
Maryland	13
Minnesota	33
New York	184
North Carolina	32
Ohio	157
West Virginia	15
Wisconsin	136
Conjunctivitis:	
Idaho	1
Diarrhea:	
Maryland	92
Diarrhea and enteritis (under 2 years):	
Ohio	105
Dysentery:	
Colorado	1
Illinois	109
Louisiana	4
Maryland	44
Minnesota	11
Minnesota (amebic)	3
New York	28
Ohio	11

	Cases
Food poisoning:	
Ohio	11
German measles:	
Colorado	2
Illinois	12
Maryland	1
New York	43
North Carolina	8
Ohio	4
Wisconsin	9
Hookworm disease:	
Louisiana	23
Impetigo contagiosa:	
Colorado	2
Maryland	4
Lead poisoning:	
Illinois	6
Ohio	1
Lethargic encephalitis:	
Colorado	1
Illinois	2
Louisiana	2
Minnesota	1
New York	8
Wisconsin	5
Mumps:	
Colorado	61
Idaho	2
Illinois	172
Louisiana	6
Maryland	13
New York	243
Ohio	61
Wisconsin	140
Ophthalmia neonatorum:	
Idaho	1
Illinois	48
Louisiana	3
New York	6
North Carolina	3
Ohio	88
Wisconsin	1
Paratyphoid fever:	
Idaho	4
Illinois	6
Louisiana	1
New York	3
North Carolina	6
Ohio	2
Puerperal fever:	
Illinois	4
New York	3
Ohio	8
Rabies in animals:	
Idaho	1
Illinois	3
Louisiana	15
Maryland	5
New York	2

[1] In New York City.

	Cases
Rabies in man:	
New York	[1] 1
Ohio	1
Septic sore throat:	
Illinois	8
Maryland	3
New York	9
North Carolina	11
Ohio	44
Scabies:	
Maryland	1
Tetanus:	
Illinois	8
Louisiana	7
Maryland	5
New York	14
Trachoma:	
Illinois	8
New York	5
Ohio	6
Trichinosis:	
Colorado	1
Illinois	1
Tularaemia:	
Illinois	1
Louisiana	2
Wisconsin	1
Typhus fever:	
Maryland	6
North Carolina	4
Undulant fever:	
Illinois	4
Louisiana	3
Maryland	1
Minnesota	4
New York	6
Ohio	5
Wisconsin	2
Vincent's angina:	
Colorado	3
Illinois	3
Maryland	6
New York	[2] 82
Whooping cough:	
Colorado	199
Idaho	60
Illinois	652
Louisiana	34
Maryland	123
Minnesota	101
New York	1,418
North Carolina	437
Ohio	401
West Virginia	145
Wisconsin	930

[2] Exclusive of New York City.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,060,000. The estimated population of the 90 cities reporting deaths is more than 30,465,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended September 13, 1930, and September 14, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	877	1,262	
97 cities	280	399	542
Measles:			
45 States	392	473	
97 cities	99	97	
Meningococcus meningitis:			
46 States	74	114	
97 cities	35	54	
Poliomyelitis:			
46 States	490	153	
Scarlet fever:			
46 States	995	1,238	
97 cities	314	327	379
Smallpox:			
46 States	134	180	
97 cities	21	17	10
Typhoid fever:			
46 States	978	883	
97 cities	164	130	172
Deaths reported			
Influenza and pneumonia:			
90 cities	340	333	
Smallpox:			
90 cities	0	0	

City reports for week ended September 13, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	1		0	0	6	3
New Hampshire:								
Concord	0	0	0		0	0	0	1
Manchester	0	0	0		0	0	0	2
Nashua	0	0	0		0	0	0	0
Vermont:								
Barre	1	0	1		0	0	0	0
Burlington	3	0	0		0	0	0	0
Massachusetts:								
Boston	6	18	6		0	15	1	13
Fall River	0	2	2		0	0	0	1
Springfield	5	2	0		0	0	6	2
Worcester	0	3	10		0	0	0	0
Rhode Island:								
Pawtucket	0	0	1		0	0	0	4
Providence	0	3	2		0	0	0	1
Connecticut:								
Bridgeport	0	3	0		0	0	0	1
Hartford	1	1	2		0	2	0	0
New Haven	0	1	0		0	0	0	2
MIDDLE ATLANTIC								
New York:								
Buffalo	2	9	5		1	0	1	9
New York	13	85	24	6	5	25	15	80
Rochester	0	2	7		0	1	0	1
Syracuse	5	2	0		0	2	2	3
New Jersey:								
Camden	2	2	0	1	1	2	2	0
Newark	4	7	1		0	0	2	6
Trenton	1	2	0		0	0	0	2
Pennsylvania:								
Philadelphia	5	33	14	4	1	10	10	26
Pittsburgh	5	13	6		0	2	0	13
Reading	0	1	1		0	0	1	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	1	6	1		1	0	2	3
Cleveland	12	24	4	1	0	3	7	5
Columbus	1	2	2	1	2	0	0	2
Toledo	0	4	1		0	1	0	2
Indiana:								
Fort Wayne	0	2	0		0	0	0	4
Indianapolis	0	5	1		0	0	0	5
South Bend	1	1	0		0	0	0	1
Terre Haute	0	1	1		0	0	0	4
Illinois:								
Chicago	9	55	64	2	1	5	4	22
Springfield	0	0	0	1	1	0	0	0
Michigan:								
Detroit	6	32	24		0	3	5	19
Flint	0	2	1		0	1	0	0
Grand Rapids	0	1	0		0	0	0	1

City reports for week ended September 13, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	2	0	0	---	0	0	2	0
Madison	0	1	0	---	---	1	0	---
Milwaukee	4	7	4	---	0	2	8	3
Racine	2	1	0	---	0	1	0	0
Superior	0	1	0	---	0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	1	0	0	---	0	0	0	1
Minneapolis	4	17	9	---	0	0	11	8
St. Paul	3	8	2	---	0	0	0	2
Iowa:								
Davenport	0	0	0	---	---	0	0	---
Des Moines	0	1	0	---	---	0	0	---
Sioux City	0	1	0	---	---	0	3	---
Waterloo	0	0	1	---	---	0	0	---
Missouri:								
Kansas City	2	3	0	---	0	0	0	3
St. Joseph	0	1	0	---	0	0	1	0
St. Louis	0	20	13	---	---	5	3	---
North Dakota:								
Fargo	0	0	0	---	0	0	13	0
Grand Forks	0	0	0	---	---	0	0	---
South Dakota:								
Aberdeen	0	0	0	---	---	0	0	---
Sioux Falls	0	0	0	---	---	0	0	---
Nebraska:								
Omaha	0	6	2	---	0	1	2	1
Kansas:								
Topeka	1	1	1	---	0	0	0	3
Wichita	0	2	1	---	0	2	0	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	2	---	0	0	0	0
Maryland:								
Baltimore	5	17	6	---	0	1	4	16
Cumberland	0	1	0	---	0	0	0	1
Frederick	0	0	0	---	0	0	0	0
District of Columbia:								
Washington	1	8	9	1	1	2	0	3
Virginia:								
Lynchburg	0	2	0	---	0	0	1	0
Norfolk	0	0	2	---	0	1	0	1
Richmond	0	13	3	---	0	0	0	1
Roanoke	0	4	4	---	0	0	0	1
West Virginia:								
Charleston	0	1	0	---	0	0	32	0
Wheeling	1	1	0	---	0	0	0	0
North Carolina:								
Raleigh	0	3	2	---	0	0	0	0
Wilmington	1	0	1	---	0	0	0	0
Winston-Salem	0	2	0	---	0	0	0	3
South Carolina:								
Charleston	0	1	1	2	0	0	0	0
Columbia	0	1	0	---	0	0	2	0
Georgia:								
Atlanta	0	5	5	8	0	0	0	2
Brunswick	0	0	0	---	0	0	0	0
Savannah	---	1	---	---	---	---	---	---
Florida:								
Miami	0	2	3	---	0	0	0	3
St. Petersburg	---	0	---	---	0	---	---	0
Tampa	0	1	1	---	0	0	0	0

City reports for week ended September 13, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0	....	0	1	0	0
Tennessee:								
Memphis	0	3	2	....	1	0	0	2
Nashville	0	4	0	....	0	0	0	1
Alabama:								
Birmingham	1	4	1	....	0	0	0	0
Mobile	0	1	0	....	2	0	0	1
Montgomery	0	2	1	....	....	0	0	....
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0	....	....	0	0	....
Little Rock	0	0	0	....	0	0	0	1
Louisiana:								
New Orleans	0	8	0	1	0	0	0	6
Shreveport	0	1	2	....	0	1	0	0
Oklahoma:								
Tulsa	0	2	1	....	....	0	0	....
Texas:								
Dallas	1	7	2	....	0	0	0	4
Fort Worth	0	2	1	....	0	0	0	1
Galveston	0	0	0	....	0	0	0	2
Houston	0	4	6	....	0	0	16	2
San Antonio	0	2	3	....	0	0	0	1
MOUNTAIN								
Montana:								
Billings	0	1	0	....	0	0	0	1
Great Falls	0	0	0	....	0	0	0	0
Helena	0	0	0	....	0	0	0	0
Missoula	0	0	0	....	0	0	0	0
Idaho:								
Boise	0	0	0	....	0	0	0	2
Colorado:								
Denver	0	10	4	....	0	1	1	11
Pueblo	0	0	0	....	0	1	3	0
New Mexico:								
Albuquerque	0	0	0	....	0	0	1	0
Arizona:								
Phoenix	1	1	3	....	0	0	0	0
Utah:								
Salt Lake City	1	3	0	....	0	2	0	0
Nevada:								
Reno	0	0	0	....	0	0	0	0
PACIFIC								
Washington:								
Seattle	5	3	0	....	....	2	13	....
Spokane	0	1	0	....	....	1	0	....
Tacoma	0	2	0	....	0	0	0	0
Oregon:								
Portland	0	5	2	....	0	2	6	3
Salem	0	0	0	....	0	0	0	0
California:								
Los Angeles	8	24	5	8	0	2	16	8
Sacramento	0	2	0	....	0	0	9	0
San Francisco	15	11	6	1	0	3	7	4

City reports for week ended September 13, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	1	0	0	0	0	1	0	0	0	11	25
New Hampshire:											
Concord	0	0	0	0	0	2	0	0	0	0	9
Manchester	1	0	0	0	0	2	0	0	0	0	14
Nashua	0	0	0	0	0	0	0	0	0	0	-------
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	3	2
Burlington	0	0	0	0	0	0	0	0	0	0	8
Massachusetts:											
Boston	16	11	0	0	0	5	3	6	0	36	166
Fall River	1	1	0	0	0	2	0	0	0	0	21
Springfield	1	0	0	0	0	0	0	1	0	0	23
Worcester	3	5	0	0	0	1	1	0	0	4	25
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	21
Providence	2	1	0	0	0	0	2	2	0	15	51
Connecticut:											
Bridgeport	1	2	0	0	0	1	0	0	0	0	24
Hartford	1	2	0	0	0	1	0	0	0	0	23
New Haven	1	1	0	0	0	1	2	0	0	11	30
MIDDLE ATLANTIC											
New York:											
Buffalo	6	4	0	0	0	0	1	2	0	22	124
New York	30	13	0	0	0	90	40	38	2	136	1,133
Rochester	2	9	0	0	0	1	1	1	0	17	42
Syracuse	2	2	0	0	0	0	1	0	0	21	31
New Jersey:											
Camden	0	0	0	0	0	2	1	0	0	1	22
Newark	4	4	0	0	0	4	1	1	0	36	77
Trenton	0	1	0	0	0	1	1	0	0	2	30
Pennsylvania:											
Philadelphia	19	15	0	0	0	18	11	9	0	10	393
Pittsburgh	13	8	0	0	0	11	4	0	0	13	143
Reading	0	1	0	0	0	1	1	1	1	2	23
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	5	6	0	0	0	5	2	3	2	8	123
Cleveland	13	14	0	0	0	11	4	8	0	20	155
Columbus	4	2	0	0	0	0	1	1	0	0	57
Toledo	3	4	0	2	0	2	1	1	1	4	56
Indiana:											
Fort Wayne	1	1	0	0	0	0	2	1	1	0	25
Indianapolis	4	1	0	2	0	4	2	1	0	13	-------
South Bend	1	4	0	0	0	3	1	0	0	1	20
Terre Haute	1	2	0	0	0	0	0	0	0	1	26
Illinois:											
Chicago	33	57	0	1	0	40	7	4	1	79	567
Springfield	0	0	0	0	0	0	1	1	0	2	18
Michigan:											
Detroit	29	16	0	0	0	21	4	7	1	62	233
Flint	6	12	0	0	0	1	1	0	0	20	23
Grand Rapids	4	8	0	0	0	0	1	0	0	5	24
Wisconsin:											
Kenosha	0	1	0	0	0	0	0	0	0	0	-------
Madison	1	0	0	0	-------	-------	0	0	-------	5	-------
Milwaukee	11	6	0	0	0	4	0	1	0	29	87
Racine	2	5	0	0	0	0	0	0	0	0	11
Superior	1	0	0	0	0	0	0	0	0	0	4

City reports for week ended September 13, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL											
Minnesota:											
Duluth	5	0	0	0	0	2	0	0	0	3	21
Minneapolis	20	2	0	0	0	3	1	3	0	1	90
St. Paul	8	1	0	0	0	2	1	1	0	12	58
Iowa:											
Davenport	0	1	0	2			0	0		1	
Des Moines	2	0	0	1			0	0		0	31
Sioux City	0	0	0	0			0	1		6	
Waterloo	1	0	1	0			0	0		1	
Missouri:											
Kansas City	4	3	1	0	0	4	2	2	0	2	105
St. Joseph	0	1	1	0	0	0	0	0	0	3	29
St. Louis	11	0	0	0	0	10	6	3	2	10	167
North Dakota:											
Fargo	2	0	0	0	0	1	0	0	0	3	5
Grand Forks	0	0	0	0			0	0		0	
South Dakota:											
Aberdeen	1	0	0	0			0	0		1	
Sioux Falls	1	0	1	0			0	0		0	7
Nebraska:											
Omaha	1	8	0	13	0	2	1	1	0	0	32
Kansas:											
Topeka	1	1	0	1	0	0	0	0	0	0	10
Wichita	2	2	0	0	0	1	1	0	0	0	32
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	1	0	0	0	0	0	1	1	0	18
Maryland:											
Baltimore	6	2	0	0	0	8	9	9	1	30	154
Cumberland	0	0	0	0	0	1	0	1	0	0	10
Frederick	0	0	0	0	0	0	0	0	0	0	2
District of Columbia:											
Washington	6	3	0	0	0	3	4	5	1	3	96
Virginia:											
Lynchburg	0	0	0	0	0	1	1	0	1	0	10
Norfolk	1	2	0	0	0	1	1	2	1	2	
Richmond	4	4	0	0	0	3	2	0	0	0	40
Roanoke	2	1	0	0	0	3	1	0	0	0	24
West Virginia:											
Charleston	1	3	0	0	0	1	2	1	0	1	17
Wheeling	1	1	0	0	0	2	2	0	0	1	15
North Carolina:											
Raleigh	0	0	0	0	0	1	0	0	1	0	14
Wilmington	0	1	0	0	0	0	0	0	0	1	9
Winston-Salem	2	2	1	0	0	0	1	6	0	2	22
South Carolina:											
Charleston	0	2	0	0	0	1	2	5	0	0	22
Columbia	0	0	0	0	0	1	1	0	0	2	20
Georgia:											
Atlanta	5	8	0	0	0	7	3	2	1	1	67
Brunswick	0	0	0	0	0	0	0	3	0	0	5
Savannah	0		0				0				
Florida:											
Miami	0	1	0	0	0	1	1	0	0	0	24
St. Petersburg	0		0		0	0	0		0		4
Tampa	1	0	0	0	0	3	0	0	0	0	18
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	1	0	0	0	0	0	1	0	0	24
Tennessee:											
Memphis	2	0	0	0	0	3	6	2	1	5	89
Nashville	2	3	0	0	0	3	5	4	1	4	42
Alabama:											
Birmingham	4	2	0	0	0	3	5	0	0	0	37
Mobile	0	0	0	0	0	0	0	0	0	0	26
Montgomery	1	0	0	0			0	1		2	

City reports for week ended September 13, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	1	0	0			0	0		0	
Little Rock	1	0	0	0	0	2	1	0	0	0	
Louisiana:											
New Orleans	2	2	0	0	0	14	4	3	0	2	125
Shreveport	1	0	0	0	0	3	0	0	0	0	22
Oklahoma:											
Tulsa	2	2	0	0			2	0		0	
Texas:											
Dallas	2	2	1	0	0	2	2	10	1	7	42
Fort Worth	1	0	0	0	0	4	1	1	0	0	34
Galveston	0	0	0	0	0	0	0	0	0	0	9
Houston	1	1	0	0	0	1	0	2	0	8	62
San Antonio	1	1	0	0	0	4	0	0	2	0	54
MOUNTAIN											
Montana											
Billings	0	0	0	0	0	0	0	0	0	7	11
Great Falls	0	2	1	0	0	0	0	0	0	2	3
Helena	0	1	0	0	0	0	0	0	0	7	4
Missoula	0	0	0	0	0	0	0	0	0	0	7
Idaho:											
Boise	0	1	0	0	0	0	0	0	0	1	8
Colorado:											
Denver	4	2	1	0	0	7	2	1	0	25	73
Pueblo	0	0	0	0	0	1	1	3	0	1	13
New Mexico:											
Albuquerque	0	0	0	0	0	4	1	2	0	0	11
Arizona:											
Phoenix	1	0	0	0	0	2	0	0	1	0	7
Utah:											
Salt Lake City	1	3	0	0	0	1	2	3	0	26	17
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	4	17	0	1			2	1		9	
Spokane	3	0	1	1			1	0		3	
Tacoma	1	2	1	2	0	1	0	0	0	3	21
Oregon:											
Portland	3	1	2	0	0	1	2	2	0	0	51
Salem	0	0	0	0	0	0	0	0	0	1	
California:											
Los Angeles	10	9	1	0	0	25	3	1	0	35	232
Sacramento	1	1	0	0	0	1	1	0	0	5	25
San Francisco	7	2	0	0	0	7	1	0	0	3	150

[1] Includes nonresidents.

City reports for week ended September 13, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND [1]									
Maine:									
Portland	0	0	0	0	0	0	0	7	0
Massachusetts:									
Boston	0	0	1	0		1	3	10	1
MIDDLE ATLANTIC									
New York:									
Buffalo	3	1	0	0	0	0	1	8	0
New York	7	0	1	0	0	0	18	1	0
Rochester	0	0	0	0	0	0	1	8	0
Syracuse	0	0	0	0	0	0	2	8	0
Pennsylvania:									
Philadelphia	0	0	0	0	0	0	1	5	1
Pittsburgh	0	0	0	0	0	0	0	0	1
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	1	5	2
Cleveland	3	1	0	0	0	0	2	12	1
Indiana:									
Fort Wayne	0	0	0	0	0	0	0	1	0
Indianapolis	1	0	0	0	0	0	0	1	0
Illinois:									
Chicago	3	0	0	0	0	0	3	17	5
Springfield	0	0	0	0	0	0	0	3	0
Michigan:									
Detroit	7	3	1	0	0	0	3	6	1
Grand Rapids	0	0	0	0	0	0	0	1	0
Wisconsin:									
Madison	1	0	0	0	0	0	0	0	0
Milwaukee	0	0	0	0	0	0	1	4	1
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	0	0	0	0	0	1	4	0
Iowa:									
Des Moines	0	0	0	0	0	0	1	1	0
Waterloo	1	0	0	0	0	0	0	2	0
Missouri:									
Kansas City [2]	0	0	0	0	0	0	1	1	0
St. Louis	2	0	0	0	0	0	1	0	0
South Dakota:									
Sioux Falls	0	0	0	0	0	0	0	4	0
Kansas:									
Topeka	0	0	0	0	0	0	1	4	1
Wichita	0	0	0	0	0	0	0	2	0
SOUTH ATLANTIC [2]									
District of Columbia:									
Washington [2]	0	0	0	0	0	0	0	0	1
West Virginia:									
Charleston	0	1	0	0	0	0	0	0	0
North Carolina:									
Winston-Salem	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston [1]	0	0	0	0	2	1	0	0	1
Columbia	1	0	0	0	0	0	0	0	0
Georgia:									
Atlanta	1	1	0	0	0	0	0	0	0

[1] Dengue, 1 death and 1 case: 1 death at Providence, R. I., and 1 case at Charleston, W. Va.
[2] Typhus fever, 18 cases and 9 deaths: 17 cases and 7 deaths at Kansas City, Mo., 1 death at Baltimore, Md., and 1 case and 1 death at Washington, D. C.

City reports for week ended September 13, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Kentucky:									
Covington	0	0	0	1	0	0	0	1	0
Tennessee:									
Memphis	2	2	0	0	0	0	0	0	0
Alabama:									
Birmingham	1	0	0	0	0	0	1	0	0
Mobile	0	0	0	0	0	1	0	0	0
Montgomery	0	0	0	0	2	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	1	0	0	0	0
Oklahoma:									
Tulsa	0	0	0	0	0	0	0	1	0
Texas:									
Dallas	0	0	0	0	2	0	0	1	0
Fort Worth	0	0	0	0	0	1	1	0	0
Houston	0	0	0	0	0	0	0	1	0
San Antonio	0	0	0	0	0	0	0	2	0
MOUNTAIN									
Colorado:									
Denver	0	0	0	0	0	0	0	0	1
PACIFIC									
Oregon:									
Portland	0	0	1	0	0	0	1	0	0
California:									
Los Angeles	2	0	0	0	0	0	1	13	3
San Francisco	0	0	1	0	0	0	0	14	2

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended September 13, 1930, compared with those for a like period ended September 14, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, August 10 to September 13, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929[1]

DIPHTHERIA CASE RATES

	Week ended—									
	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929
98 cities	31	61	34	61	[2] 40	62	[3] 41	[4] 64	[5] 46	66
New England	40	38	40	63	[6] 53	45	35	[4] 46	55	47
Middle Atlantic	23	59	28	58	31	54	31	45	28	41
East North Central	36	86	41	69	46	75	49	86	64	95
West North Central	27	23	25	25	27	25	34	38	55	58
South Atlantic	35	47	37	75	[7] 60	90	60	92	[5] 65	133
East South Central	34	82	13	55	13	116	54	75	27	116
West South Central	52	122	67	141	71	137	[3] 61	133	49	61
Mountain	17	44	43	26	[8] 70	17	43	70	34	26
Pacific	35	31	26	29	19	27	38	34	26	22

MEASLES CASE RATES

	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929
98 cities	33	24	28	20	[2] 20	14	[3] 25	[4] 12	[5] 16	16
New England	60	29	60	38	[6] 19	20	33	[4] 21	38	16
Middle Atlantic	11	15	33	13	23	8	28	7	20	12
East North Central	19	35	21	33	8	22	13	16	9	20
West North Central	30	13	19	8	27	8	30	2	15	6
South Atlantic	22	15	18	0	[7] 30	13	26	2	[5] 6	7
East South Central	20	0	7	14	13	7	27	14	7	7
West South Central	7	23	0	4	11	8	[3] 0	4	4	11
Mountain	43	52	26	52	[8] 35	44	51	26	34	61
Pacific	50	46	47	39	35	19	40	46	19	39

SCARLET FEVER CASE RATES

	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929
98 cities	31	39	33	41	[2] 42	41	[3] 43	[4] 52	[5] 51	54
New England	51	49	47	45	[6] 53	38	55	[4] 83	51	52
Middle Atlantic	18	17	27	15	28	16	25	25	27	16
East North Central	30	50	35	63	48	63	47	70	85	90
West North Central	28	40	34	58	42	44	57	67	34	58
South Atlantic	26	73	27	31	[7] 67	45	66	64	[5] 53	47
East South Central	54	14	31	68	115	34	67	41	40	96
West South Central	34	38	37	65	15	72	[3] 69	34	26	91
Mountain	43	78	86	44	[8] 88	61	34	17	77	70
Pacific	38	53	33	51	31	46	33	77	73	72

SMALLPOX CASE RATES

	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929
98 cities	3	7	2	3	[2] 2	4	[3] 3	[4] 4	[5] 3	3
New England	0	0	0	0	[6] 0	0	0	[4] 0	0	0
Middle Atlantic	0	3	0	0	0	0	0	0	0	0
East North Central	3	16	0	4	0	10	3	10	2	4
West North Central	6	4	8	6	8	4	13	2	27	8
South Atlantic	0	0	2	0	[7] 0	0	4	0	[5] 0	2
East South Central	7	7	0	0	0	0	0	0	0	0
West South Central	4	0	7	8	4	4	[3] 0	0	0	0
Mountain	0	9	0	26	[8] 0	0	0	9	0	9
Pacific	14	12	12	17	12	14	14	14	9	12

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930 and 1929, respectively.
[2] Hartford, Conn., Columbia, S. C., and Helena, Mont., not included.
[3] Fort Smith, Ark., not included.
[4] Pawtucket, R. I., not included.
[5] Savannah, Ga., not included.
[6] Hartford, Conn., not included.
[7] Columbia, S. C., not included.
[8] Helena, Mont., not included.

Summary of weekly reports from cities, August 10 to September 13, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929
98 cities	21	20	19	30	[2] 25	27	[3] 21	[4] 18	[5] 27	21
New England	4	11	16	27	[6] 12	29	11	[4] 2	20	16
Middle Atlantic	15	19	14	34	21	28	22	20	25	18
East North Central	10	5	9	12	10	13	12	13	17	10
West North Central	28	6	21	13	19	23	13	12	21	17
South Atlantic	40	39	55	51	[7] 82	52	53	34	[5] 63	34
East South Central	148	123	88	103	47	103	54	55	54	89
West South Central	45	46	26	88	71	50	[3] 50	15	56	50
Mountain	26	61	26	70	[8] 14	17	9	44	60	70
Pacific	14	17	7	5	9	12	9	14	5	19

INFLUENZA DEATH RATES

	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929
91 cities	1	3	3	3	[2] 4	2	3	[4] 3	[5] 3	3
New England	0	0	0	2	[6] 0	0	0	[4] 2	0	0
Middle Atlantic	2	2	3	3	3	2	3	2	4	2
East North Central	0	2	1	4	4	2	2	6	3	2
West North Central	3	3	0	0	3	0	6	0	0	6
South Atlantic	0	0	7	2	[7] 7	2	7	4	[5] 2	2
East South Central	0	22	0	0	7	0	0	7	22	7
West South Central	0	12	4	8	8	4	11	0	0	12
Mountain	0	17	9	9	[8] 0	9	9	0	0	9
Pacific	0	3	9	0	3	0	0	3	0	0

PNEUMONIA DEATH RATES

	Aug. 16, 1930	Aug. 17, 1929	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929
91 cities	55	57	46	54	[2] 53	55	55	[4] 57	[5] 55	55
New England	38	52	51	25	[6] 48	49	51	[4] 44	62	36
Middle Atlantic	72	71	55	60	60	61	68	75	67	66
East North Central	28	35	28	47	50	51	36	44	43	47
West North Central	27	33	35	48	38	33	50	57	44	45
South Atlantic	68	62	48	73	[7] 52	56	62	64	[5] 51	52
East South Central	59	90	74	37	52	52	103	75	29	90
West South Central	92	78	61	66	38	98	54	31	61	55
Mountain	120	35	51	52	[8] 53	44	51	52	120	70
Pacific	49	72	49	50	55	28	34	31	31	41

[2] Hartford, Conn., Columbia, S. C., and Helena, Mont., not included.
[3] Fort Smith, Ark., not included.
[4] Pawtucket, R. I., not included.
[5] Savannah, Ga., not included.
[6] Hartford, Conn., not included.
[7] Columbia, S. C., not included.
[8] Helena, Mont., not included.

FOREIGN AND INSULAR

BRAZIL

Bahia—Mosquito index—Quarter ended June 30, 1930.—According to a recent report, there were no cases of yellow fever reported at Bahia, Brazil, during the quarter ended June 30, 1930. The *Aëdes aegypti* index of the city was reported to be well under 10 during the quarter.

Work on the new water supply system for the city of Bahia was advancing rapidly.

CANADA

Provinces—Communicable diseases—Week ended September 6, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended September 6, 1930, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia				3		6
New Brunswick						3
Quebec				3		18
Ontario	5		2	64	2	14
Manitoba				2		3
Saskatchewan				1		3
Alberta	1			13		1
British Columbia		1				3
Total	6	1	2	86	2	51

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended September 13, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended September 13, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	2	Puerperal fever	1
Chicken pox	12	Scarlet fever	57
Diphtheria	32	Tuberculosis	47
Erysipelas	1	Typhoid fever	18
Measles	24	Whooping cough	31
Poliomyelitis	1		

DENMARK

Communicable diseases—June, 1930.—During the month of June, 1930, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	10	Mumps	906
Chicken pox	21	Paratyphoid fever	15
Diphtheria and croup	311	Poliomyelitis	2
Erysipelas	194	Scabies	592
German measles	12	Scarlet fever	161
Influenza	2,415	Typhoid fever	10
Lethargic encephalitis	5	Undulant fever, (Bac. abort. Bang)	35
Measles	1,819	Whooping cough	1,193

FRANCE

Alsace-Lorraine—Poliomyelitis.—A report dated August 28, 1930, states that 331 cases of poliomyelitis had been reported in the city of Strasbourg and its environs up to August 25. The epidemic seemed, however, to be abating, 7 cases having been reported during the period from August 11 to 25 as compared with 35 cases during the preceding 10-day period.

The disease has been centered around Strasbourg and the localities to the north and northeast. Of the 561 communes constituting the Bas-Rhin, 95 were reported to be affected on August 25.

GREAT BRITAIN

England and Wales—Vital statistics—April–June, 1930.—During the second quarter of the year 1930, 170,212 births and 111,353 deaths were registered in England and Wales, giving a birth rate on an annual basis, of 17.2 per 1,000 population, and a death rate of 11.3 per 1,000. The figures are provisional. The mortality of infants under 1 year of age was 57 per 1,000 live births.

During the 13 weeks ended June 28, 1930, deaths from certain communicable diseases were reported in 107 county boroughs and great towns, including Greater London, as follows:

Disease	Number of deaths	Death rate per 1,000 population	Disease	Number of deaths	Death rate per 1,000 population
Diarrhea and enteritis (under 2 years)	573		Scarlet fever	105	0.02
Diphtheria	464	.09	Smallpox	6	
Influenza	471	.10	Typhoid fever	31	
Measles	1,044	.21	Whooping cough	331	.07

Deaths from certain communicable diseases were reported in 158 smaller towns for the quarter ended June 30, 1930, as follows:

Disease	Deaths	Disease	Deaths
Diarrhea and enteritis (under 2 years)	87	Scarlet fever	20
Diphtheria	90	Smallpox	1
Influenza	154	Typhoid fever	4
Measles	151	Whooping cough	63

England and Wales—Communicable diseases—Thirteen weeks ended June 28, 1930.—During the 13 weeks ended June 28, 1930, cases of certain communicable diseases were reported in England and Wales as follows:

Disease	Cases	Disease	Cases
Diphtheria	15,483	Puerperal pyrexia	1,300
Ophthalmia neonatorum	1,442	Scarlet fever	24,548
Pneumonia	12,932	Smallpox	4,217
Puerperal fever	631	Typhoid fever	895

Scotland—Vital statistics—Quarter ended June 30, 1930.—The Registrar General of Scotland has published the following statistics for the second quarter of the year 1930:

Population, estimated	4,879,700	Deaths from—Continued.	
Births	24,816	Lethargic encephalitis	24
Birth rate per 1,000 population	20.4	Malaria	2
Deaths	15,886	Measles	332
Death rate per 1,000 population	13.1	Nephritis (acute)	58
Marriages	8,283	Nephritis (chronic)	426
Deaths under 1 year	1,822	Paratyphoid fever	5
Deaths under 1 year per 1,000 births	73	Pneumonia	783
Deaths from—		Poliomyelitis	5
Bronchitis	817	Puerperal sepsis	57
Broncho-pneumonia	591	Scarlet fever	28
Cerebrospinal meningitis	71	Syphilis	24
Diabetes	133	Tetanus	2
Diphtheria	92	Tuberculosis (pulmonary)	828
Dysentery	1	Tuberculosis (other forms)	388
Erysipelas	51	Typhoid fever	6
Heart disease	2,132	Whooping cough	236
Influenza	118		

ITALY

Communicable diseases—Four weeks ended June 8, 1930.—During the four weeks ended June 8, 1930, cases of certain communicable diseases were reported in Italy as follows:

Disease	May 12-18		May 19-25		May 26-June 1		June 2-8	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	14	12	11	11	21	18	12	12
Cerebrospinal meningitis	18	15	13	13	8	8	16	16
Chicken pox	369	136	287	130	267	138	357	135
Diphtheria and croup	480	284	387	229	364	201	324	195
Dysentery	7	6	11	4	4	4	3	3
Lethargic encephalitis	4	3			1	1	5	4
Measles	3,148	477	3,181	485	3,061	445	2,711	446
Poliomyelitis	5	5	8	7	9	8	12	9
Scarlet fever	386	148	419	136	401	136	378	144
Smallpox	1	1						
Typhoid fever	307	172	270	146	267	172	300	164

MEXICO

Tampico—Communicable diseases—August, 1930.—During the month of August, 1930, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	4		Tuberculosis	40	27
Enteritis, various		32	Typhoid fever	3	4
Malaria	195	9	Whooping cough	8	1
Measles	6	2			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30	September, 1930: 6	Sept. 13	Sept. 20
Afghanistan	C						[1] P						P				
China:																	
Canton	C			3	2		2	1									
	D						1										
Shanghai	C													8	4		
Swatow	C			3	7					1							
India	C	10,817	41,462	56,311	37,102	6,728	5,520	5,701	8,172								
	D	5,866	27,906	44,878	25,711	3,712	3,095	3,133	3,882								
Bassein	C		7	7											1		
	D		5	5													
Bombay	C	4								3	2	3	6				
	D									2	1	1	4				
Calcutta	C	354	647	609	327	81	53	49	37	18	10	17	18	8	10		
	D	220	414	372	179	54	28	23	23	7	7	10	6	3	3		
Negapatam	C				1												
	D				1												
Rangoon	C	2	1	9	6	1				1					1		
	D	2	1	3	4	1				1							
India (French):																	
Chandernagor	C	1	6	6	3			1									
	D	3	5	6	2												
Karikal	C	12	1		3												
	D	9	1		3												
India: Portuguese	C											P					
Indo-China (see also table below):																	
Pnompenh	C		2	1	40	9	16	7		5	3	3					
	D	6		5	18	6	9	5	2	3	2	1					
Saigon and Cholon	C	14	76	160	48	7	1	1	1		2	1					
	D	6	55	101	23	3					1						

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930 5	12	19	26	August, 1930 2	9	16	23	30	September, 1930 6	13	20
Philippine Islands:[1]																	
Ports—																	
Cebu	C				1	20	13	13	9	5	4			1	1		
	D					9	7	12	8	4	4			1	1		
Iloilo	C						1	11	17	9	19	32	4	3	4	1	2
	D							9	13	10	18	19	9	4	5	2	3
Manila	C			1							1			16	13	5	4
	D													5	6	1	
Provinces—																	
Antique	C									14	3		3	2	21	12	8
	D									7	3		2	1	10	12	7
Bohol	C										54	54	31	24	26	4	1
	D										29	32	15	11	11	2	
Bulacan	C				3		1	1	2	1				1	1	1	
	D				1									1			
Capiz	C							2	1	1	1			1			
	D							1	1	1	1						
Cebu	C			1	355	313	222	115	63	55	26	4		1	16	8	
	D			1	170	131	83	60	29	32	15	3		1	6	4	
Iloilo	C				2	20	45	85	159	143	209	127	88	74	57	66	46
	D				1	10	23	64	96	77	143	91	64	51	44	37	26
La Union	C						1										
Leyte	C				47	11											
	D				19	11											
Masbate	C				10	14	32	25	21	15	19						
	D				3	2	18	5	10	5	9						
Misamis, Occidental	C					1	2										
	D					1	2										
Negros, Occidental	C			10	140	62	163	172	171	151	79	45	72	40	47	21	15
	D			7	88	42	90	122	114	97	64	33	47	31	32	18	9
Negros, Oriental	C					1	1	6	15	6	2						
	D						1	3	9	1	3						
Nueva Acija	C								1								
	D								1								
Pampanga	C				2	2								1			

Pangasinan	C					2		1		1							
	D					2				1							
Rizal	C				1		1										
	D				1		1										
Samar	C										5	3	10			2	1
	D										5	3	8			2	
Surigao	C										15	2	21	3			
	D										9	2	10	3			
Tarlac	C									1							
Siam	C	1	29	33	27	8	3	8	1				15				
	D		13	21	19	4	1	3	1				1				
Bangkok	C	2	15	9	12		3	4	1	1		1					
	D	1	4	3	5		1	1	1	1		1					
Nagara Pathom	C		10														
	D		2														
Songkla	C						8		2								
	D						4		2								
On vessel:																	
S. S. Sassari at Massoua, from Jeddah	C			1													
	D			1													
On small boat at Port Cebu, from Bantayan Island	C				1												
	D				1												

Place		February, 1930	March, 1930	April, 1930	May, 1930			June, 1930			July, 1930			August, 1930	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):															
Annam [1]	C	4	52	60		20	3	2	14				1		3
Cambodia [1]	C	90	81	24	5	31	52	56	88				43	37	22
Cochin-China [1]	C	65	82	48	188	224	259	147	126				46	22	5

Reports incomplete.
Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	14	21	28	July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13
Algeria:																			
Algiers	C									1	2			1		6	1	2	
Constantine	C				1				1										
Oran	C										2	1	1	1	1	1	1	2	3
Philippeville	C																	1	
Azores: Ponta Delgada	C		8																
	D		5																
Belgian Congo	C								2				1		1		2	3	
	D								2				1		1			3	
British East Africa (see also table below):																			
Tanganyika	C		44																
	D		20																
Uganda	C	98	117	227	121	77	105	103		50	100	78	52						
	D	87	105	195	75	70	93	90		47	97	69	50						
Canary Islands: Las Palmas	D													1					
Ceylon:																			
Colombo	C	4	1	6	1				1	2					1	1	2		
	D	4	1	5	1				1	2					1	1	3		
Plague-infected rats		2	4		1														
Chile: Antofagasta	C	1	1																
	D	2	1																
China: Manchuria—Tungliau and Nungan	C																		P
Dutch East Indies:																			
Batavia and West Java	C	124	87	82	19	27	28	24	19	25	18	22	19	30					
	D	122	81	82	19	27	28	24	19	25	18	22	19	30					
Plague-infected rats		3	8	5	3	1								1					
Java and Madura	D	223	173	185	40	45	63	54	55	56	58	48	45	51					
Ecuador (see table below).																			
Egypt:																			
Alexandria	C	4	2	13	3	6	6	4	8	8	3	4	2	2	4	3	3	3	2
	D	1	2	3	2		2	5	2	3	2	3	2	1	3		5	1	2
Assiout	C		14	20	4	2	3		1	1									
	D		5	5		1		2	1	1									

Beheira	C	4																	
Beni-Suef	C	4														1			
Dakahlieh	C	5	5	11	1														
	D	1		2															
Gharbieh	C		1										3						
	D		1										1						
Girga	C		1							1							1		
Minieh	C			7	1	1	4	4	2	1									
	D			1		1													
Port Said	C		1	2	1			1				1	1						
France:																			
Marseilles	C																2	2	1
St. Ouen	C										1								
	D										1								
Gambia	C															4			
	D															4			
Greece (see also table below):																			
Patras	C	1					1				1								
Pyrgos	C	1																	
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats							1												
India	C	4,087	2,215	648	55	59	62	64	70	75	87	145							
	D	3,344	1,960	635	42	52	43	50	46	46	62	102							
Bassein	C	3															1		
	D	1															1		
Bombay	C	7	4	6	1		2					1						1	
	D	5	8	5			1	1				1						1	
Plague-infected rats		86	108	81	6	7	8	5	13	14	10	15	10	8	9	9	12	9	
Madras Presidency	C	157	44	38	26	10	3		10	1	10	26	35		7				
	D	87	19	11	15	2	5		4	1	9	17	13		1				
Rangoon	C	3	5	4				1				2	2	1			2	1	
	D	3	4	3				1				2	1	1			2	1	
Plague-infected rats		3	4	5			1		2	2		2	4		2	1	2		
India (Portuguese)	D			7											P				
Indo-China (see also table below):																			
Pnompenh	C		3	3	6					1	1			2		2	2	1	
	D	13	4	1	5	1		1		1	1								
Saigon and Cholon	C	1		1	1		1											1	
	D	1					1												
Iraq: Baghdad	C	7	6	37	12	4	8	4	10	4	2	2	4	3	2				
	D	4	2	18	7	3	5		5		1	1		2	1				
Japan: Osaka (vicinity of)—Plague-infected rats		4	3																
Kwang-Chow-Wan	C	7	37	34	23		8					4			1				
Madagascar (see also table below): Tamatave	C		1		1														P
Morocco	C	55	121	71	2		1					1		8	7				
	D	18	45	34	4									1	1				
Nigeria: Lagos	C	13		2	1		3	1	1				2	1	3	1		1	
	D	5		2	1		3	1	1				2	1	3	1			
Plague-infected rats		25	7	17	1	4	1	5	2	3	6	7			4	4			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930: 7	June 14	June 21	June 28	July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30	September, 1930: 6	Sept. 13
Senegal (see table below).																			
Siam	C	16	5	5									2	3					
	D	15	6	4									1	3					
Bangkok	C	5		5									1	2					
	D	4		4										2					
Nagara Pathom	C	1	10																
	D	1	9																
Nagara Rajsima	C	1	1										1			1			
	D	1	1										1			1			
Syria: Beirut	C					2	5	5		2	4	3		1		1	3	2	
Tripolitania	C														2				
Tunisia:																			
Sfax district	C		1	21	6		3					6		1					
Tunis	C	1	4	1		1				1	4								
	D				1					1									
Union of Socialist Soviet Republics:																			
Salsk Region	C				1			1			3	2	4		3				
	D				1						2	2	3		2				
Stavropol Region	C				1														
	D				1														
Union of South Africa:																			
Cape Province	C	1		P	1						1								
	D	1									1				1				
Orange Free State	C	5	1																
	D	3																	
Transvaal	C	1																	
	D	1																	

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
British East Africa (see also table above):							
Kenya	C	85	16	171	107	97	27
Ecuador: Guayaquil	C	2	0	0	0		
	D	0	0	0	0		
Plague-infected rats		2	0	0	0		
Greece (see also table above)	C		1		1		
Indo-China (see also table above)	C	27	4		11	1	2
Madagascar (see also table above):							
Ambositra Province	C	25	14	1			
	D	20	12	1			
Antisirabe Province	C	38	46	19	3		
	D	36	45	19	3		
Itasy Province	C	4					
	D	4					
Miarinarivo Province	C	14	1	5	1		
	D	14	1	5	1		
Madagascar (see also table above)—Con.							
Moramanga Province	C	5	3	1	3		
	D	5	3		3		
Tananarive Province	C	52	39	15	16		
	D	52	38	14	16		
Senegal:							
Baol [1]	C	18	24	13	2	62	39
	D	8	12	11	2	48	11
Dakar [1]	C		2	52	53	140	56
	D		2	42	117	122	46
Louga [1]	C		33	54	60	138	49
	D		10	27	21	103	20
Thies [1]	C	3	12	21	52	54	20
	D	2	9	8	35	30	8
Tivaouane [1]	C	11	71	135	43	119	29
	D	8	38	69	28	70	24

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930 7	14	21	28	July, 1930 5	12	19	26	August, 1930 2	9	16	23	30	September, 1930 6	13
Algeria:																			
Algiers	C	5	1	3						1				1		2			
Constantine	C						1				1								
Oran	C	1																	
Arabia: Aden	C	3	1						1										
Bolivia: La Paz [1]																			
British East Africa (see also table below):																			
Tanganyika	C	103	57	409	385	755	196	274	64	4		100	26	51					
	D	7	14	70	154	90	31	26	13	2		27	4						
British South Africa:																			
Northern Rhodesia	C	9	1	59															
	D		2	9															
Southern Rhodesia	C		66	155	75	1	3		1	12	18								
	D		1	13															
Canada:																			
Alberta	C	10	4							2	1	2	1						
Edmonton	C	4	3																
British Columbia—Vancouver	C	20	17	4	1	1			2	2	1	1	1	1		2			1
Manitoba	C	4	4	10			4												
Ontario	C	100	77	82	14	10	13	10	3	5	6	10	8		5	4			6
North Bay	C			1															
Ottawa	C	19	21	25	6		8	1	1	1	4	7	5	1	1		2	1	2
Toronto	C			4	2	1	1			1									1
Quebec	C							4	3					2		1			
Montreal	C												7						
Saskatchewan	C	47	41	39		12	10			2		3				8			1
Regina	C			4															
Ceylon: Angoda, Western Province	C		6																
	D		2																
China:																			
Canton	C	6	3		1														
	D	2	3																
Chungking	C		P	P	P			P	P	P	P	P	P		P				

Foochow	C		P	P		P		P		P		P		P					
Hong Kong	C	38	18	12	2	1	1			2									
	D	25	23	9	1		1	1		1									
Manchuria—																			
Harbin	C		1	20	4														
Kwantung—Dairen	C		2	8		11	5		8										
	D			4			1												
Nanking	C	P	P	P	P	P				P	P	P	P	P	P				
Shanghai—																			
Foreigners only	C	2	3	2	1	1	1	2	1	1	1	1	3						
Including natives	D	10	10	5	1		1	1											
Swatow	D	6	3	6	1		1	2	1				1		2		1		
Tientsin	C	2	2	1															
Chosen (see table below.)																			
Colombia:																			
Barranquilla	C	2	1																
Buenaventura	C		15	4	1	1		4	4	3	2	1		1	1				
Costa Rica:																			
Port Limon	C		6	2	2														
San Jose [2]	C	10	7	2															
Curacao (alastrim)	C	14	2	2		1			2					1					
Dutch East Indies:																			
Borneo	C	185	90	16	2	10				2									
	D	12	31	1		1													
Java—																			
Batavia and West Java	C	78	64	12	1	4	6	2	3	1	3	1	1		1	2			
	D	6	11	7		1	2		2	1	1	1	1		1	2			
East Java and Madura	C		4								1								
Sanggi Islands	C	5	160	26							11		36						
	D	1	24	5							3		2						
Sumatra	C	48																	
	D	5																	
Egypt: Port Said	C		1	1						2		1							
Great Britain:																			
England and Wales	C	1,700	1,427	1,417	237	266	241	182	156	138	126	109	70	86	95	93		106	
Ashton under Lyne	C	15	18	17			3	4		4	2	2							
Bradford	C		3	2					1										
Cardiff	C	2	3						2										
Leeds	C	16	2						1										
London	C	710	602	637	130	136	125	107	84	52	62	48	36	50	41	51		44	
London and Great Towns	C	1,239	1,066	1,078	197	208	190	158	127	96	102	83	61	73	71	80	79	84	
	D	3	3																
Sheffield	C	8	2																
Stoke-on-Trent	C	122	85	62	3	10	15	4	3	2	1	3	1	1					
Scotland	C				1		3			1								5	
	D									1									
Honduras: Naco	C																		5

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930				July, 1930				August, 1930					September, 1930	
					7	14	1	28	5	12	19	26	2	9	16	23	30	6	13
India	C	39,329	34,843	22,835	3,686	3,550	3,174	2,552	2,258	2,006	1,853	1,513							
	D	9,109	6,983	5,451	1,065	913	905	648	733	580	577	458							
Bombay	C	718	430	218	36	35	23	19	17	15	11	7	6	2		2		1	
	D	431	270	161	27	23	19	10	13	9	9	2	5	2		2		1	
Calcutta	C	361	495	302	46	45	45	25	27	19	13	14	4		12	9		5	
	D	305	403	258	50	37	29	30	17	17	12	10	4		8	9		4	
Cochin	C	291	183	37	4	1	10	1			4	2	2	4	4	4	1		
	D	35	13	8	2	1	1										1		
Karachi	C	33	30	14	5		1	1				1	2		2				
	D	47	17	4	2		1						2		1				
Madras	C	173	133	72	9	10	8	8	6	10	17	16	19		9	10	9	11	
	D	36	27	15	6	3	1		4	1	3	4	3		5	3	1	1	
Moulmein	C	146	43	89		9	6	6	4	10	3	1				2	1		
	D	41	7	21		3	3	1	3	4	1	2				1			
Negapatam	C			1		1		1			1		2		2		1	2	
Rangoon	C	10	4	6	1	5	1	2	2	1	1		1	1	1				
	D	5		1			1	1											
Tuticorin	C			5			1												
Vizagapatam	C	69	6	5		1													
	D	18	2	3															
India (French):																			
Chandernagor	C	6	10	24	4	8	5	2	3	1	4								
	D	2	2	7			2	1	1	1	1								1
Karikal	C	24	19	12	4	3	1	3	1		1			8		1		5	
	D	7	8	3	2	2	1	3	1		1			8		1		2	
Pondicherry Province	C	21	24	40	4	4	9	6	4	9	8	5	7	8				7	1
	D	13	20	36	4	4	9	6	3	9	8	5	7	8				7	
India (Portuguese)	C	38	44	47		3	18	7	1				1	6					
	D	2	8	8		2	2	6				1	1						
Indo-China (see also table below):																			
Pnompenh	C			3							1								
	D		2		1						1				1				
Saigon and Cholon	C	3	5	3	1									1					
	D	1	5	2									1	1	1		1		

Iraq:																			
Baghdad	C		8	1	1				1	1	1				1				
	D		1	1							1				1				
Basra	C		1																
Mossoul Liwa	C		22	21		1		3	47	20									
	D		3	3		1			19	1									
Ivory Coast. (See table below.)																			
Jamaica (alastrim)	C			2															
Japan: Tokyo	C		1																
	D		1																
Macao	D	3	2	1															
Mexico (see also table below):																			
Jalisco (State) Guadalajara	D	22	20	7	4		5	6	3	1				1					
Juarez	C	2					6							2					
	D						1							1					
Mexico City and surrounding territory	C	106	99	80	17	23	20	17	10	12	4	11	2	3	3		7		
	D	31	47	32	5	4	3	5	2	3	1	2	1	3	2		1		
Progreso	C			1															
	D			1			1												
Morocco. (See table below.)																			
Nigeria: Lagos	C	1	1					1											
Poland	C		7	3															
Portugal:																			
Lisbon	C	7	8	8	1		2	7		7		6		6	19	25	7	8	
Oporto	C															1			
Rumania	C	2																	
Siam	C		8	2					2		4								
	D		4								3								
Somaliland, British: Boales	C	2																	
	D	6																	
Spain	C					4		8		1	1	3	2						1
Straits Settlements	C	5	5	11	5		1	3	1	2	7	1	1	1	1	5	1	2	
	D	1	2	3	1		1		1	1	1				1	1		1	
Sudan (Anglo-Egyptian)	C	60	42	19	4	8	1	54	8	1		3				42	102	5	20
	D	5	4	2				3		1						3	50	2	
Sudan (French). (See table below.)																			
Switzerland: Berne Canton	C											1	1	1					
Syria. (See table below.)																			
Taiwan: Taihoku. (See table below.)																			
Tunisia: Tunis	C	3	4	2			2					1							
Turkey. (See table below.)																			
Union of South Africa:																			
Cape Province	C	P	P	P								P							
Orange Free State	C	P									P	P	P						
Transvaal	C	P												P					
Upper Volta	C	2	3	1			8	5											
Zanzibar	C	13																	
On vessel:																			
S. S. Elysia, at Port Sudan, from Bombay	C		1																
S. S. Naldera, at Port Said	C			1															
S. S. Manoa, from Honolulu to San Francisco	C								1										

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		February, 1930	March, 1930	April, 1930	May, 1930			June, 1930			July, 1930			August, 1930	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (see also table above)	C	434	26	261		173	132	80	133				238	59	34
Ivory Coast	C		7												
Sudan (French)	C	213	609	521	40	56	178	76				34			
	D	11	49	36	7	7	18	18							
Syria: Beirut	C	18	17	19			7	6	1				2		
Taiwan: Taihoku	C	43	58	12											

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
British East Africa (see also table above):							
Kenya	C	12	175	174	171	142	
Uganda	C	109			78		
	D	99			69		
Chosen	C	263	236	253	107		
	D	71	53	53	35		
Seishin	C	4		5	2		
	D	1		1	1		

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
France	C	23	8	58	51		
Mexico: Durango (see also table above)	D	6	5	4	4	3	3
Morocco	C	74	17	10	18	5	3
Turkey	C	114		3	16		
	D	42					

TYPHUS FEVER

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930				July, 1930				August, 1930					September, 1930	
					7	14	21	28	5	12	19	26	2	9	16	23	30	6	13
Algeria:																			
Algiers	C	6	8	15	2		1			1	2	3				2		8	
Constantine Department	C	11	15	6	11		1			1	1					3			
Oran	C			3				4		2	1			1			1		
Arabia: Aden	C	1																	
	D	1																	
Bolivia: La Paz.[1]																			
Brazil: Porto Alegre	C			1															
Bulgaria	C	9	15	6	1		9	6		4	5	1		1				2	
	D		1	2	1						1								
China:																			
Manchuria—Harbin (see also table below)	C	4	52	13	3	3	2		2										
Shanghai	C	1												1					
Chosen. (See table below.)																			
Czechoslovakia. (See table below.)																			
Egypt:																			
Alexandria	C		1				1	1	1						1			1	
Beheira Province	C	2	2	49	17	16	7	5		5	1	9							
	D			13	1	1		2		1		1							
Cairo	C												2			5			
Port Said	C															4		1	
Great Britain: Scotland—																			
Dunfermline	C									1									
Glasgow	C			1															
	D			1															
Greece (see table below):																			
Iraq: Baghdad Liwa	C	2																	
Ireland:																			
Irish Free State—																			
Galway County—Oughterard	C											2							
Kerry County—Dingle	C		5																
Leitrim County—Mohill	C							9				1							
Mayo County—																			
Ballina	C			2		1				1									
Castlebar	C															1			
Swinford	C			14															
Westport	C										2		1						

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended—														
					June, 1930				July, 1930				August, 1930					September, 1930	
					7		21	28	5	12	19	26	2	9	16	23	30	6	13
Ireland—Continued.																			
Irish Free State—Continued.																			
Roscommon County—																			
Roscommon	C										1								
Strokestown	C										1								
Wicklow County—Shillelagh	C					1		3	1		1								
Latvia. (See table below.)																			
Lithuania. (See table below.)																			
Mexico: Mexico City, including municipalities in Federal District	C	4	4	6	2	3	1	3	2		2	1	2	2	2		2		
	D	1	4	3		1							1	1					
Morocco	C	38	15	11	1		6	8		4	3	4				8		2	
	D	7	3																
Palestine	C	6	1	2	2				3	1	1	1		1	1	1		1	1
Poland	C	228	243	171	39	15	26	37		24		12	10	15	2	7		3	
	D	13	15	5	3	3	2	3		4			1		1	1		1	
Portugal:																			
Lisbon	C		4																
Oporto	C	2	1												1				
Rumania	C	185	186	227		32	26												
	D	12	11	35		3	2												
Spain: Valencia	C					2		1		3									
	D									1									
Tunisia	C			6			2	16			14	10	2	5		3			
Turkey. (See table below.)																			
Union of South Africa:																			
Cape Province	C	P	P	P			P	P	P	P	P								
Natal	C	P	P	P			P		P	P	P	1							
Orange Free State	C	P		P			P	P	P	P	P								
Transvaal	C		P								P		P	P					
Yugoslavia. (See table below.)																			

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
China: Harbin (see also table above)	C	--------	37	204	240	--------	--------
Chosen: Seoul	C	17	--------	3	43	--------	--------
Czechoslovakia	C	2	42	29	12	1	--------
Greece: Athens	C	6	3	1	3	3	6
Latvia	C	--------	--------	--------	3	3	3
Lithuania	C	70	62	73	27	16	3
	D	5	4	4	--------	--------	--------
Turkey	C	3	1	3	16	2	--------
Yugoslavia	C	33	46	22	16	6	--------
	D	5	2	4	1	--------	--------

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

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UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

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OCTOBER 10 - - - - 1930

SPECIAL ARTICLES

The Effect of Typhoid Vaccine When Given After Infection

Undulant Fever, With a Special Study of Infection in Iowa

UNITED STATES
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PUBLIC HEALTH REPORTS

VOL. 45 OCTOBER 10, 1930 NO. 41

A STUDY OF THE EFFECT OF TYPHOID VACCINE WHEN GIVEN AFTER INFECTION

By J. H. CROUCH, M. D., C. P. H., *Epidemiologist, Montana State Board of Health; Collaborating Epidemiologist, United States Public Health Service*

In the epidemic of typhoid fever which occurred in Helena in the latter part of 1929, a total of 216 cases occurred either in residents of Helena or in persons who had recently visited the city and who were presumed to have received the infection there. A fairly complete record was made of 182 cases, which record includes, besides the epidemiological data, certain clinical features that might be considered of importance from a public-health standpoint. Among other items of information it was noted that 77 of these patients had received one or more doses of typhoid vaccine either just prior to or during the course of the disease. All except a very few received the first dose after the probable date of infection. A study was made in the effort to determine what effect, if any, this vaccine had on the duration and severity of the disease, by comparing these 77 cases with 105 cases occurring in the same epidemic which did not receive any vaccine.

Duration was considered as the number of days elapsing from the day on which the first symptoms were noticed up to and including the last day on which the temperature went above 98.6° F. This included any relapse or other complication. Duration was determined only for those cases in which the patients recovered, and so four cases are omitted from those who received vaccine and eight cases from the control group.

It was very difficult to devise a method for measuring severity, and the plan finally adopted is a crude one and open to much criticism. It is sufficiently accurate, however, to determine wide variations in severity of the cases in this series, although it would be useless for comparison with other cases. Severity was divided into five groups or degrees, viz, "mild," "moderate," "severe," "very severe," and "fatal," and a numerical value was given to each group expressed as "per cent of severity," as follows: Mild, 20 per cent; moderate, 40 per cent; severe, 60 per cent; very severe, 80 per cent; and fatal, 100 per cent. Cases were classed as "mild" when there were just

sufficient symptoms to make a positive diagnosis, such as moderate continued fever, very little toxemia, and enlarged spleen, and nervous symptoms were slight or absent. "Moderate" includes those cases which presented a definite picture of the disease, with moderate toxemia, usually slight delirium, and prognosis considered favorable throughout the course. "Severe" cases are those which presented the typical textbook type of the disease, with high temperature, considerable delirium, and doubtful prognosis. "Very severe" cases are those which had, in addition to the condition described as severe, one or more critical periods in which the prognosis was very unfavorable. "Fatal" includes all cases which died, although several had important contributing causes of death.

Nearly all of the patients were personally visited by the author, most of them several times, and in this way a definite knowledge was had of the severity of the disease in each case. After the epidemic was over, each attending physician was interviewed and the plan of classification explained. Each case was then discussed in detail, and an agreement was reached as to the group in which it should be placed.

Since the age of the patient might have an influence on duration or severity, the cases were divided into 10-year age groups, but no significant variations seemed to be shown.

The cases were separated into three classes according to the time at which the vaccine was given. "Prophylactic vaccine" group includes all cases in which the first dose was given before the onset of symptoms. Those who had the first dose after symptoms started but before going to bed were placed as "delayed prophylactic vaccine" group. A few patients had the first dose of vaccine on the day on which the symptoms started, and these are included in this second group. Patients who had the first dose after going to bed were placed as "therapeutic vaccine" group.

A total of 24 patients had three doses, three of the patients completing the treatment more than 10 days prior to onset and 7 others getting at least one dose more than 10 days prior to onset; 12 patients had their first dose between 1 and 10 days prior to onset, and 2 began the injections after onset but before going to bed. Fifteen patients had 2 doses of vaccine each, 11 of them getting the first dose between 1 and 8 days prior to onset, and 4 after onset but before going to bed. Twenty-one patients had only one dose of vaccine, 6 of them before and 15 after symptoms had started.

The vaccine used was the combined typhoid bacillus, paratyphoid bacillus A, and paratyphoid bacillus B, and for prophylaxis the usual standard doses were given at six or seven day intervals. The therapeutic doses were one-half the usual prophylactic dose and were given at three or four day intervals.

GROUP I.—*Prophylactic vaccine (three doses). First dose given before symptoms started*

Age group	0-9	10-19	20-29	30-39	40-49	50-59	60 and over	Total
Number of cases	3	13	3	1	1	1	0	22
Number of deaths	0	0	0	0	0	0	0	0
Average duration (days)	21.3	17.8	21.3	21.0	16.0	64.0	0	21.0
Average severity (per cent)	33.3	30.8	26.7	40.0	20.0	60.0	0	31.8

GROUP II.—*Prophylactic vaccine (one and two doses). First dose given before symptoms started*

Number of cases	1	7	3	6	0	0	0	17
Number of deaths	0	0	0	1	0	0	0	1
Average duration (days)	30.0	24.7	28.7	30.6	0	0	0	27.6
Average severity (per cent)	80.0	42.9	60.0	56.7	0	0	0	52.9

GROUP III.—*Delayed prophylactic vaccine (one, two, and three doses). First dose given after symptoms started but before patient went to bed*

Age group	0-9	10-19	20-29	30-39	40-49	50-59	60 and over	Total
Number of cases	2	9	3	4	2	1	--------	21
Number of deaths	0	0	0	0	0	1	--------	1
Average duration (days)	27.0	32.0	31.7	38.5	52.5	0	0	34.8
Average severity (per cent)	30.0	46.7	40.0	65.0	60.0	100.0	0	51.4

GROUP IV.—*Therapeutic vaccine (one, two, and three doses). First dose given two to eight days after patient went to bed*

Age group	0-9	10-19	20-29	30-39	40-49	50-59	60 and over	Total
Number of cases	0	4	6	7	0	0	0	17
Number of deaths	0	1	0	1	0	0	0	2
Average duration (days)	--------	30.3	27.3	31.0	0	0	0	29.4
Average severity (per cent)	--------	80.0	46.7	57.1	0	0	0	58.8

GROUP V.—*No vaccine (control group)*

Age group	0-9	10-19	20-29	30-39	40-49	50-59	60 and over	Total
Number of cases	9	25	33	15	12	7	4	105
Number of deaths	0	0	4	1	2	0	1	8
Average duration (days)	25.7	34.0	31.7	37.0	41.4	39.4	28.0	33.9
Average severity (per cent)	51.1	54.4	54.5	52.0	65.0	48.6	60.0	54.9

Group I has 22 cases which received three doses of vaccine, the first at least being given prior to onset of symptoms. Comparison of these with the control group shows that they had a very definitely shorter duration and less severity. If we study separately the 10 cases which had their first dose more than 10 days prior to onset, the difference in duration and severity is even more striking. These 10

cases had an average duration of 16.9 days and an average severity of 28 per cent. The other 12 cases in Group I had an average duration of 24.3 days and average severity of 35 per cent.

Group II has 17 cases which received only partial prophylaxis, but started before onset. Eleven of them received two doses and 6 received one dose. The duration in these subdivisions was about equal, being 28.1 days and 26.6 days, respectively; but the severity was considerably less in those who received two doses, being 47.3 per cent as compared with 63.3 per cent in those who received one dose. Comparison of this group as a whole with the control group apparently shows that while the average duration is shortened by about six days the severity is approximately equal.

Group III represents 21 cases in which the first dose was given shortly after the onset of symptoms, but before the patient went to bed. Two of these received three doses, 4 received two doses, and 15 received one dose. Both duration and severity were greater in those receiving two and three doses than in those who had only one dose. The group as a whole shows very little variation from the control group.

Group IV contains 17 cases who received vaccine after going to bed. Eleven of them received three doses each, 2 received two doses, and 4 received one dose. The two patients in this group who died each received two doses. As previously stated, the amounts given were one-half the prophylactic dose, given at three or four day intervals, and the first dose was given two to eight days after the patient had gone to bed. The attending physicians report that there was a very noticeable reaction following each dose. In these cases the average duration was a few days less, but the severity was at least as great as in the control group.

SUMMARY

Comparison of the findings in the control group with those of the four groups who received vaccine indicates that the patients in Group I were definitely benefited as to both duration and severity. In Groups II and IV the duration was shortened a few days, but the severity was about the same. In Group III both duration and severity were about the same as in the control group.

CONCLUSIONS

The data presented in this study would seem to justify the tentative conclusion that typhoid vaccine is well worth while when given after the infection is received, provided the first dose is given before the onset of symptoms and provided further that three doses are given.

Typhoid vaccine when given soon after the onset of symptoms is of little or no benefit.

UNDULANT FEVER [1] [2]

With Special Reference to a Study of Brucella Infection in Iowa [3]

By A. V. Hardy, *Acting Assistant Surgeon, United States Public Health Service; Associate Professor of Preventive Medicine, University of Iowa College of Medicine;* and *Director of the Laboratories of the Iowa State Department of Health;* C. F. Jordan, *Acting Assistant Surgeon, United States Public Health Service,* and *Assistant Professor of Preventive Medicine, University of Iowa College of Medicine;* I. H. Borts, M. D., *Chief Bacteriologist of the Laboratories of the Iowa State Department of Health;* and Grace Campbell Hardy, M. B. (Toronto), *Research Associate, Department of Preventive Medicine of the State University of Iowa*

CONTENTS

I. INTRODUCTION

The attention of physicians and health officers has recently been directed to the problem presented by the recognition of an apparently new disease, undulant fever, due to *Brucella melitensis* var. *abortus,* and *Brucella melitensis* var. *suis.* That this infection undoubtedly has occurred in the past, though the true nature of it was not suspected, increases the interest of the problem. During the past three years pertinent facts have rapidly accumulated in studies made here and there. A general dissemination of these among the profession is highly desirable, hence the assembling and considering of the data now set forth. Believing that they may be useful to others, we have included some charts, graphs, and tables, which have been found of value in presenting the prominent features of the disease to assembled physicians.

Although separate consideration is here given to *Br. melitensis* (varieties *abortus* and *suis*) infection, it is not desirable that it be regarded as a disease entity distinct from infection with *Br. melitensis* var. *melitensis,* but its characteristics should be as thoroughly studied and as widely known. Similarities and differences would in this way become apparent, and thereby a complete picture of undulant fever be obtained. Although we have had opportunity to

[1] The observations on which this paper is based were made with the support and under the auspices of the United States Public Health Service, the Iowa State Department of Health, and the Department of Preventive Medicine of the Iowa State University aided by a grant from the committee on research of the American Medical Association.

[2] Manuscript submitted for publication July 30, 1930.

[3] This article will be reprinted later as National Institute of Health Bulletin No. 158.

observe more than 300 cases of infection with the *abortus* and *suis* varieties of *Br. melitensis*, our knowledge of undulant fever of caprine origin has of necessity been derived from the literature. It is our purpose, therefore, to present our own observations of *Br. melitensis* (varieties *suis* and *abortus*) infection, to supplement these with the findings of other investigators, and finally to compare the characteristics revealed with the features of undulant fever of caprine origin as they have been described.

In Iowa an attempt has been made personally to investigate all reported cases of undulant fever. Blood specimens for diagnostic agglutination tests are sent by physicians located in all parts of the State to the laboratories of the State department of health, conducted in conjunction with the department of preventive medicine of the State University of Iowa. Sera for specific examination for undulant fever are also sent here from hospitals and private laboratories. In this way we have obtained a clue to all suspected or established cases. Those patients whose serum agglutinated *Brucella* in a dilution of 1:80, or higher, were sooner or later visited. (The field studies were conducted by A. V. Hardy or C. F. Jordan.) Our clinical information was thus obtained directly by questioning and examining patients, and was supplemented by contributions from attending physicians and from clinical records so kindly placed at our disposal. The patient, other members of his family, and sometimes dairymen and veterinarians supplied us with data relative to sources and means of transmission of the infection. In the field we not infrequently inoculated culture media and guinea pigs with the patient's blood, or with milk from suspected cattle. Except during the early part of the study, responsibility for collecting blood or milk from animals, after we had obtained permission for their examination, was assumed by the State department of agriculture. A fairly complete study of many of our cases was made possible by this widely cooperative endeavor. It was soon apparent that *Brucella* infection of hogs as well as of cattle was widespread in the State. This situation gave us an unusual opportunity to study comparatively the *abortus* and *suis* varieties of *Br. melitensis* infection in man.

Our investigation, therefore, has been facilitated by a very liberal cooperation, received not only from the organizations under whose auspices the study was conducted, but also from the State department of agriculture, the State veterinary college, and many physicians, veterinarians, hospitals, and clinics. We wish to express personal appreciation for this generous interest and cooperation which has not only made this investigation a pleasure, but has in large measure given it such value as it may have.

The writers wish to express appreciation for the guidance, encouragement, and assistance of Dr. Henry Albert, Commissioner of Health

of the State of Iowa; Dr. H. E. Hasseltine, Surgeon United States Public Health Service in charge of field studies in undulant fever; Medical Director George McCoy, Director of the National Institute of Health; and Dr. Ludvig Hektoen, Chairman of the committee on contagious abortion, National Research Council. Further acknowledgment is also made of the special services of Miss E. Felsenthal, Medical Librarian, and Miss Thelma De Capito, of the Hygienic Laboratory, State University of Iowa.

II. HISTORICAL

The history of *Br. melitensis* infection can be introduced best by reference to the outstanding features of the early history of undulant fever. Hughes (1) pointed out that Hippocrates gave descriptions of fevers which detailed the characteristics of this infection. He also stated that different writers between 1722 and 1800 gave evidence of having observed undulant fever. One, for example, described fevers which ran an irregular course, were incurable by bark, marked by excessive perspiration, and followed by relapse after relapse. Moreover, the medical officers who served in Malta from 1800 repeatedly testified as to its occurrence and increasing prevalence between the years 1854 and 1860. During these latter years Marston (2), one of the medical officers stationed in Malta, included in his "Report on Fever" for 1861 a full and accurate description of a disease which he called Mediterranean remittent, or gastric remittent, fever.

So significant is this contribution that the following is quoted from his introductory paragraph: "By this is meant a fever characterized by the following symptoms and course; a preliminary stage of subacute dyspepsia, anorexia, nausea, headache, feeling of weakness, lassitude, and inaptitude for exertion, mental or physical, chills, muscular pain, and lastly, a fever having a long course, three to five or ten weeks, marked by irregular exacerbations and remissions, great derangements of the assimilative organs, tenderness in the epigastric region, and splenic enlargement. It is prone to relapses, has a protracted convalescence, and is frequently marked by rheumatism."

The accuracy of his observations was soon recognized. Five years later Chartres (3) confirmed these in a vivid description which is applicable also to infection with all varieties of *Brucella.* "So mild were the symptoms in some of the cases that it became a matter of nice discrimination to distinguish the sick man from the mere pretender. On the other hand, the patient sometimes appeared to have been completely prostrated at once by the severity of the onset. However, in many of these the suddenness of the attack was more apparent than real, for a careful inquiry often revealed a previous stage of dyspepsia, debility, and languor." So it was that between the years 1860 and 1870, among the various fevers comprising the

"miasmatic diseases," undulant fever became a distinct clinical entity.

The studies progressed, and in 1887 Surg. David Bruce (4) demonstrated the etiological agent of the infection. Ten years later Wright and Semple (5) first applied the agglutination test to aid in the diagnosis—obviously an important advance in the study of a disease with such wide clinical variations.

In view of the prevalence of Mediterranean, Malta, or undulant fever among the military and naval forces in the British Mediterranean territories, a commission was appointed representing the Army, the Navy, and the Civil Government of Malta to make further investigations of the disease. From 1904 to 1907 this group included Bruce, Bassett-Smith, Horrocks, Shaw, Eyre, Kennedy, Zammit, and others (6). By detailed and laborious studies the nature of the organism and the character of the disease were determined, but almost by accident was the source of the infection discovered, and with this a knowledge of the means of prevention. Small laboratory animals were not readily available on the island, but goats were; and so in planning animal experiments it was decided to test their susceptibility. Six goats were purchased. Much to the surprise of Zammit (6), he found in the preliminary blood examination that five of the six already had a high agglutination titer for *Micrococcus melitensis*. This finding was confirmed by Horrocks (6), and it was soon established that these animals were naturally infected. It was a simple matter then to show that goats were the common source of infection, and that the disease was acquired by the men in the Army through the drinking of raw goat's milk. On June 1, 1906, orders prohibiting the use of raw goat's milk by the men in the Army and Navy were issued. The results were striking, as demonstrated in Figure 1, a reproduction from Eyre (7). Until recently it was considered an established fact that undulant fever had its sole source in goats and was transmitted through the use of their raw products. In the diagnosis of the infection, therefore, the main consideration was given to the question of the direct or indirect contact with goats and use of their milk.

In this country the early recognized cases were among men recently returned from the Tropics, the first case being reported in 1898 by Musser and Sailer (8). Attention was again called to the infection by Curry (9) in 1901. Craig (10), however, not only detected several cases among the men in the Army, but in 1904 he established the diagnosis of a case in a nurse who had never been out of the country. At the time when she contracted her illness there were no cases of Malta fever on the wards on which she was nursing. (We have suspected that this may have been a case of infection with the *abortus* or *suis* variety of *Br. melitensis*.) Craig then suggested that many

cases, supposedly atypical typhoid fever, were in reality undulant fever. This suggestion was evidently given little consideration, since the cases next recognized were those reported in Texas by Gentry and Ferenbaugh (11) (12) in 1911. Case reports by Yount and Looney (13) and others soon followed. The disease then faded from medical consciousness, and from 1915 until 1920 there were no known established diagnoses. The startling epidemic in Phoenix,

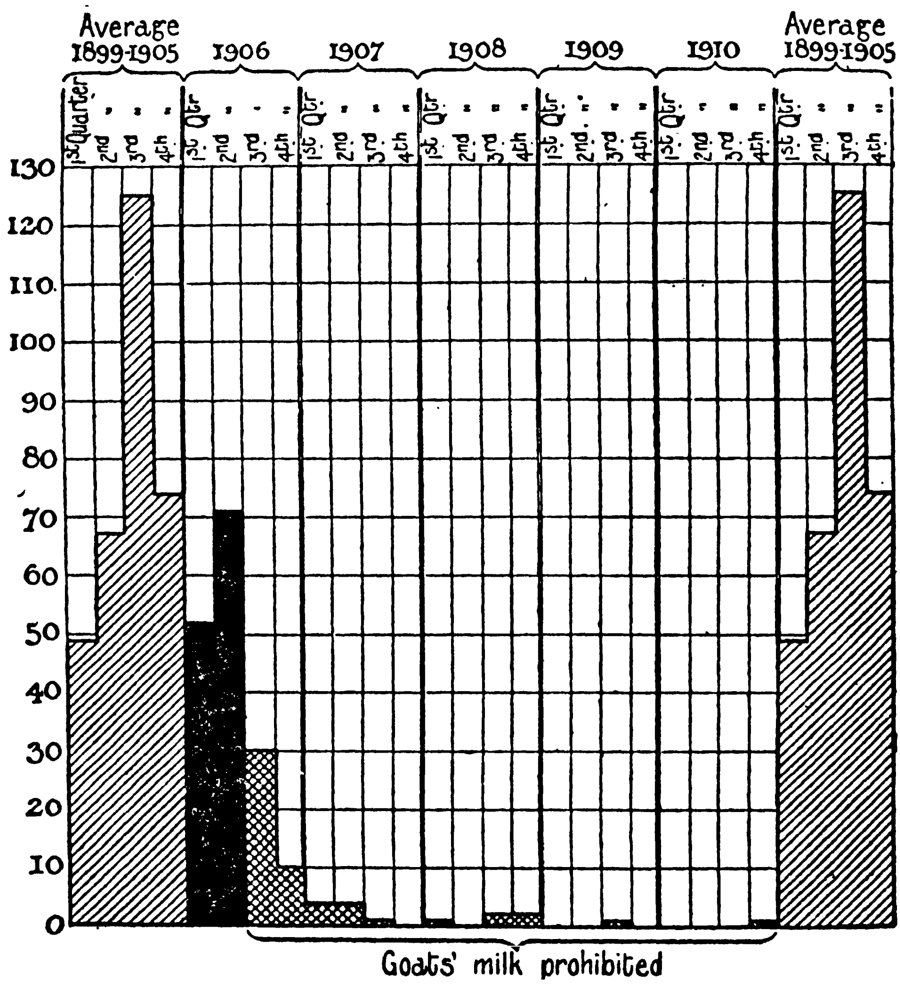

Figure 1.—The effect of the prohibition of goats' milk on the incidence of undulant fever in the military forces in Malta

Ariz., in 1922, studied by Lake and Watkins (14) (15) revived interest in the infection so that cases were again reported from the goat-raising areas. Thus, we see that the first cases recognized in this country either occurred in persons who had close association with goats or who had acquired their infections in foreign territory.

As *Brucella* infection of domestic animals is now very widespread throughout this country—and doubtless was even before its specific etiological agent was isolated—we have suspected that cases of human

infection have also occurred, though given erroneous diagnoses or even none at all. In searching the American medical literature of the latter half of the last century, we have found numerous references to severe epidemic diseases with high mortality rates, but comparatively few sporadic infections which terminated in recovery, such as *Br. melitensis* var. *abortus* infections. A few which have come to light contain almost classical descriptions of the disease as we know it to-day. Hoff (16), writing in 1880, after describing four cases of "typho-malarial fever," which now appear to have been undulant fever rather than Rocky Mountain spotted fever or tularaemia, says: "Owing doubtless to the sparseness of population, the rarity of the disease, and most of all to the fact that the pioneers of our profession are as a rule workers, not recorders * * * the literature of the subject is extremely meager."

The term "typho-malarial fever" was coined by Woodward (17) during the Civil War, for the purpose of designating infections which occurred among the soldiers and which otherwise would have been left without a category. These fevers were supposed to be modifications of typhoid fever occurring in malarious individuals, and manifested characteristics of both typhoid fever and malaria. We have found recorded under this name descriptions of typhoid fever, malaria, Rocky Mountain spotted fever, and other diseases so altered by the drastic purgatives then in vogue as to be quite unrecognizable, and in addition some which we believe to have been undulant fever, presumably due to *Brucella* infection of the *abortus* or *suis* variety. Fly (18), of Illinois, in 1880, described in a vivid manner the characteristic chills, anorexia, and muscle soreness; Good (19), of Ohio, in 1881, the frontal headache, constipation, enlarged spleen, and prostration; Hoyt (20), of Georgia, in 1873, the stiffness and night sweats; and Caulkins (21), of Michigan, in 1878, openly flouting the idea that the presence of malaria in an individual could change typhoid into a disease relatively mild and nonfatal, recorded cases to which we later refer. His was a rural practice in southeastern Michigan, and he states that although typhoid fever and malaria had both been very prevalent in previous years, this new mild type of fever had only appeared since the autumn of 1861. "Abdominal typhus or typhoid fever," he states, "is not the fatal disease that it was 25 or 30 years ago. Not only are its most malignant features softened down, and its mortality rate of 20 per cent much diminished, but it has a somewhat different clinical history in respect that the enteric symptoms formerly visible at the outset of the disease are at first wanting. * * * The intermissions will be so distinct that the medical attendant sees nothing in the cases but an ordinary malarious attack, which he confidently expects, and probably promises the patient and friends, to arrest in a day or two. The day or two, however, pass, and

in spite of his predictions and a vigorous use of his antiperiodics, the surprised and baffled doctor is obliged to stand impotently by and see the disease run on, until at last he is compelled reluctantly to acknowledge that it is a case of typhoid fever with which he has to deal. Nearly all the continued fever that practitioners, in the country district at least, meet with at present is marked by this composite character and deserves a new and expressive name typho-malarial fever, a name that describes the disease so well that it has been almost unanimously adopted by the profession."

Following a discussion of the possible cause of this infection (a new poison produced by the confluence of that of typhoid and of malaria), Caulkins briefly relates the outstanding features of cases from which the following notes are abstracted:

"*Case 1.*—Symptoms first week, chills alternating with profuse sweats, red tongue, vomiting, no diarrhea. Second week all the symptoms abated except the night sweats which, if anything, were worse. Patient was able to be up and walk about for four days. Supposed himself well if his sweats would stop and his appetite come back. Third week, relapse of all the bad symptoms." Then follow daily notes. "The bowels not having been evacuated for 48 hours, took a tablespoonful of castor oil," and later, "no diarrhea, no headache, mind clear, sweat during night excessively." The following day, "sweat as bad as ever to such a degree that from his shirt water could be wrung. Morning temperature 101°, evening temperature 104¼°." At the end of the fourth week it was noted that "gradual improvement followed until the end of the fifth week, at which time the evening temperature was 100°. The night sweats lasted some time longer."

Case 2.—Described as similar to the first, though the sweats were not so severe.

Case 3.—Described as "similar to the first two, the sweating in particular."

He then adds: "The noticeable points in these three cases are the high temperatures, slow pulse, and excessive perspiration. Two other cases of milder type of continued fever showed the same sweating disposition." Discussing treatment he notes: "Too much attention can not be given to cleanliness. Owing to the drenching sweats it is necessary to wash the patient often, and change the clothing and bedding."

Interesting also are extracts from a paper entitled "Protracted, Continued, Simple Fever," written by J. M. DaCosta (22), of Philadelphia, in 1896, who says: "With full appreciation of the difficulties of clear discernment, * * * I still believe in the existence of a continued fever of considerable duration that is not typhoid or malarious fever that has become continuous." He endeavors "to ascertain in how far these continued fevers form a type of their own," and describes two cases, the first as follows:

* * * Shortly afterwards an inexplicable fever arose that lasted for three months. The fever was never very high; it did not, I think, ever exceed 103°, was not ushered in by a chill, nor did chills happen during its continuance. There were, as in any fever, morning remissions and evening exacerbations, but never

to a marked degree. The fever was for weeks remarkably regular, only at times, and at no stated period, showing irregularities in its course, and its subsidence and disappearance were gradual and unmarked by violent changes as in onset. Late in the disease some sweating happened. Beyond the extraordinary fever there was nothing of note. There were no cerebral symptoms, save occasional headache, neither nausea nor vomiting, no epistaxis, no diarrhea—the bowels were indeed rather sluggish—no abnormal lung or heart conditions, no albumin in the high-colored fever urine, no eruption of any kind, not a single even doubtful rose spot, a slight enlargement of the spleen was made out, but it was not decided. Indeed, there was nothing whatever amiss except the apparently interminable fever. The convalescence did not prove a protracted one, emaciation was obvious, yet considering the length of the fever not extreme * * * and the long fever was totally uninfluenced by quinine, as in truth it was by any other remedy. It seemed to leave when it had determined to leave.

Though no diagnosis can be established in retrospect, still we feel that these records justify the opinion that undulant fever has for many years past occurred in widely scattered regions of this country.

Though *Bacillus abortus* was isolated by Bang (23) in 1897, it was not until after 1918 that the possibility of its pathogenicity for man was given adequate consideration. The true relationship of the so-called *Micrococcus melitensis* of Bruce and the *Bacillus abortus* of Bang was established at that time by Evans (24). After this Bevan (25) (26), Keefer (27), Gage and Gregory (28), Huddleson (29), Carpenter and Merriam (30), and others, reported cases of human infection, known or believed to be caused by *abortus* or *suis* variety of *Br. melitensis;* and as these reports were widely read, a new interest was displayed. There followed then detailed studies mainly by those concerned with animal as well as human infections, notably, Theo. Smith, Huddleson, and Carpenter. Only gradually did the medical profession become aware of the problem and the more recent studies which resulted will be described in subsequent sections.

III. ETIOLOGY, BACTERIOLOGY, AND IMMUNOLOGY

ISOLATION AND IDENTIFICATION OF THE ETIOLOGICAL AGENT

That the etiological agent of undulant fever in the Mediterranean region was first isolated by Surgeon David Bruce (4) has already been mentioned. In December, 1886, in stained sections prepared from the spleen removed from a soldier who had died of the infection, "an enormous number of micrococci were seen scattered throughout the tissues." Several months later these studies were resumed and cultures were made from the spleen of other cases. Growth appeared in 68 hours, and "when a minute portion of the culture was placed in a drop of sterilized water, and examined under a high power, innumerable small micrococci were seen." Any observations made on stained preparations were not mentioned. Bruce and others, particularly Hughes (31), were repeatedly successful in isolating a similar organ-

ism from the tissues of persons who died of undulant fever, and in time it was recognized as the etiological factor and given the name "*Micrococcus melitensis*."

Durham (32), in 1898, also took up the work and investigated the pathogenicity for various animals. He called attention to the occurrence of bacillary forms; but as yet no one thought of associating this bacterium which often does produce abortion in goats with that which caused a similar manifestation in cattle described just one year previous. It was at that time that Bang and Stribolt (23) found small organisms in the uterus of a cow with threatened abortion which had purposely been slaughtered for study. Examining the yellow, odorless exudate found between the uterine wall and the fetal envelope, there appeared great numbers of organisms. "In clumps the bacteria mostly had the appearance of cocci, but some of the free-lying individuals were of longer shape, and these were first regarded as short oval structures. Culture examinations, however, under very high magnifications showed that we had in fact to deal with a small bacillus." Other early observations made by Bang (23) are particularly interesting. Cultures were made in serum-gelatin agar, and he noted that growth occurred ½ to 1½ centimeters under the surface, but not above or below this. Considering this phenomenon dependent on a peculiar oxygen requirement, Bang and Stribolt investigated further and observed that in either an increased or decreased oxygen tension growth was luxuriant, and took place on the surface. The fact that the tubes were sealed in these experiments was not taken into account, but we can now explain the phenomenon by the peculiar carbon-dioxide requirement of this variety of the species. That this organism was the etiological agent of contagious abortion of cattle was established by their work, and has been confirmed by Preisz (33), Nowak (34), McFadyan and Stockman (35), Zwick (36), McNeal and Kerr (37), and more recently by various others. The designation *Bacillus abortus* was generally accepted.

The isolation from swine of a similar organism, though differing in that it grew readily on the surface of solid media when incubated in air, was first reported by Traum (38), in 1914, and by Goode and Smith (39), in 1916. The observations of these workers have also been adequately confirmed, notably by Doyle and Spray (40), and Conaway and his associates (41).

The important contribution made by Evans (24) grew out of her studies of *Bacillus abortus* infection in cattle, carried out from 1916 to 1918. Comparative studies were undertaken, selecting for detailed investigation *Bacterium bronchisepticus* "and the organism which causes Malta fever." She found that, morphologically, culturally, biochemically, and by simple agglutination tests, the *Micrococcus*

melitensis and *Bacillus abortus* were indistinguishable. At the same time she suggested and discussed the possibility that the latter might be pathogenic for man. This same possibility had been proposed by Schroeder and Cotton (42), in 1911, when they noted that the organism was found in cow's milk, and that on inoculation it produced a tubercle-like lesion in guinea pigs. Some attempts to establish such speculation as fact were made by Larson and Sedgwick (43), and Nicoll and Pratt (44). Cooledge (45) seriously questioned the whole matter.

Even after this recognition of the two organisms as one species, the work was not further pursued. However, when reports of human infections caused by the *abortus* organism appeared, veterinarians and physicians attacked the problem with a new vigor.

NOMENCLATURE

With the establishment of the true relationship of the *Micrococcus melitensis* and the *Bacillus abortus*, it became essential that one or both of these organisms be renamed and reclassified. In this there is as yet no complete accord. The generic name, *Brucella*, was suggested by Meyer (46), in 1920, and this has been quite generally adopted. Beyond this there is not entire agreement. Evans (47) has renamed the organisms as follows: The *Micrococcus melitensis* to be *Brucella melitensis* var. *melitensis;* and *Bacillus abortus* to be *Brucella melitensis* var. *abortus.* Since we now recognize two distinct types of the variety *abortus*, it is further necessary to indicate whether the organism is an *abortus* variety of the bovine or porcine type; hence one finds this rather cumbersome designation for one organism, "*Brucella melitensis* var. *abortus*, porcine type." A simplification of such a nomenclature seems desirable. Huddleson (48) has suggested that the three types be designated by the name *Brucella melitensis*, *Brucella abortus*, and *Brucella suis.* We do not favor this nomenclature, since it seems to assume the occurrence of three distinct biological species, and, in view of the slight differences, such an assumption would not be justified. We believe that the organisms under consideration should certainly be classified as the same species, but at the present time there is no generally accepted species name. Physicians and medical bacteriologists commonly use *melitensis* for all varieties; veterinarians still retain *abortus.* Since *melitensis* was proposed earlier, it would seem that it should be adopted by all according to the rule of priority.

We favor the use of the nomenclature of Evans (47), and in order to simplify the designation of the organisms generally designated as bovine and porcine types of *abortus* we suggest the terms *Brucella melitensis* var. *abortus*, and *Brucella melitensis* var. *suis*, respectively.

This would make the summary of the nomenclature of the Brucellae of undulant fever read as follows:[4]

Micrococcus melitensis (Bruce) to be *Brucella melitensis* var. *melitensis*.
Brucella abortus (Bang) to be *Brucella melitensis* var. *abortus*.
Brucella abortus (Traum) to be *Brucella melitensis* var. *suis*.

CHARACTERISTICS COMMON TO ALL VARIETIES OF BRUCELLA

The three varieties of *Brucella* have in common all the characteristics by which microorganisms are ordinarily differentiated. They are small (0.3 to 0.5 by 0.6 to 1.5 micron), nonencapsulated, nonmotile, and decolorized by Gram's method. Coccoid and bacillary forms occur, as well as intermediary oval shapes. Any slight differences in shape are inconstant and are not regarded as of value in classification. Coccoid forms may predominate in infected tissue. Grown artificially, the occurrence of bacillary forms is the rule. Growth takes place slowly. In liquid media it is rarely apparent earlier than the fourth day, and occasionally not until 10 days or later. Growth of the first subculture, planted on agar, usually makes its appearance in from 48 to 72 hours as minute, translucent, discrete colonies. These gradually increase in size and assume a pale amber hue. Subcultures made from plain broth media at 48 and 72 hours consistently fail to reveal *Brucella*, a fact responsible no doubt for the failure to recognize, at an earlier date, human infections with the *abortus* and *suis* varieties of *Brucella*. Unless a bacteriological examination is performed with *Brucella* in mind, rarely will it reveal the organism. In view of this characteristic and of the widespread occurrence of *Brucella* infection, we have adopted and recommend the prolonged incubation of blood cultures, making subcultures semiweekly for four weeks before reporting as negative. The subcultures are observed for a period of one week.

All varieties of *Brucella* fail to ferment carbohydrates. The results are identical, or nearly so, when simple serological tests are used.

THE DIFFERENTIATION OF THE VARIETIES

In differentiating the varieties four tests have been used, which singly may be inconclusive, but together allow a classification of *Brucella*.

In the simple agglutination tests, final titers may differ slightly when immune sera are combined with *melitensis*, *abortus*, or *suis* antigen. These differences are inconstant and entirely unreliable for purposes of classification. That there are actually differences in the agglutinins has been reported by Evans (47), who by agglutinin absorption was able to differentiate the *abortus* from the *melitensis*

[4] EDITORIAL NOTE: Should future research indicate that each variety should be classed as a distinct species the variety name would become the species name and agree with the species names already proposed by Huddleson.

strains, and to detect different serological types. In the hands of others, this method either has given varying results (Feusier and Meyer (49)), or has been entirely ineffective (Simonetti (50)). It is generally agreed that there is no serological difference between the bovine (*abortus*) and porcine (*suis*) varieties; hence this test is applicable only in differentiating the *melitensis*, or caprine variety, from the other varieties. Living antigens are more sensitive, but, because of the danger of infecting laboratory workers we feel that the adoption of this test is rarely justifiable.

An outstanding characteristic of the *abortus* variety is its peculiar atmospheric requirement. Bang (23) noted that growth occurred a short distance under the surface of his solid media, and believed that this indicated that the organism grew best under partially anaerobic conditions. With this suggestion in mind, Nowack (34) was able to obtain growth on the surface of solid medium if the cultures were sealed in a container along with an adequate amount of actively growing *B. subtilis* cultures. The true explanation of these observations was pointed out by Huddleson (51), who found that it was the increase in the carbon dioxide tension which stimulated growth. This observation has greatly facilitated the study of *Br. melitensis* var. *abortus*. The *suis* and *melitensis* varieties have no similar requirement, and the failure of an organism to grow on first subculture in an atmosphere without an increased carbon dioxide tension differentiates the *abortus* from the others. Occasionally, however, one finds atypical strains which, from the first, grow in an unmodified atmosphere. Moreover, by repeated subcultures, this limiting characteristic may be lost, and can not be relied upon as a final means of differentiation. The successful isolation of *Br. melitensis* var. *abortus* requires the supplying of this increased carbon dioxide tension (from 1 to 10 per cent by volume). An apparatus which we have found very convenient is illustrated in Figure 2, and was constructed according to the type observed in Huddleson's laboratory. Earlier the carbon dioxide was produced chemically by adding an acid to a carbonate. This method was also satisfactory.

Through studying the bacteriostatic action of dyes on the *Brucella*, Huddleson (48) has devised a simple and, we believe, accurate test to be used in classifying varieties. The dyes are added to fresh beef liver infusion agar, immediately after the medium has been adjusted to a pH of 6.6. Thionin in a 1:25,000 dilution inhibits the *abortus* but not the *suis* variety. Methyl violet in a 1:100,000 dilution and basic fuchsin in 1:25,000 inhibit *suis* but not *abortus*. The *melitensis* variety grows satisfactorily on all three of these dyes. For the success of this test certified dyes [5] must be obtained and the pH carefully adjusted.

[5] We have used the National Aniline dyes with good results.

True variations in pathogenicity can be determined only by the use of recently isolated strains. For this reason comparative study of the varieties has not been conclusive. Distinct differences between the *abortus* and the *suis* varieties have been demonstrated by Theo. Smith (52), Cotton (53), and others. We have found that guinea pigs infected with the *suis* variety lose weight, appear rough, and not infrequently die, whereas those similarly inoculated with the *abortus* variety often appear quite healthy and may gain weight. Involvment of joints, bones, testes, and marked general enlargement of spleen, liver, and lymph glands usually with abscesses, are common findings in guinea pigs infected with the *suis* variety. Such conditions ordinarily are not found in animals infected with the *abortus* variety. Confusing features, however, are the variations in susceptibility of guinea pigs, and in virulence of the organisms. An *abortus* strain may occasionally give rise to lesions similar to those produced by a *suis* strain and the converse may be observed; hence a classification on this basis is not absolute.

A difference in utilization of dextrose and nitrogenous compounds has been described by McAlpine (54), (55), (56), and a variation in the amount and rate of hydrogen sulphide production by Huddleson and Abell (57). These will probably not prove of superior value in classifying the varieties. Nonspecific agglutination by heat, acid, and other chemicals, has been advocated by some as a differential test. This has been studied by Ross (58), who was not able to demonstrate its value.

STUDIES OF ORGANISMS ISOLATED FROM IOWA CASES

Brucella has been isolated from the blood stream of 48 patients in Iowa. In one case both the *abortus* and *suis* varieties were obtained from a single culture, thus giving us 49 strains. These have all been typed, including a number repeatedly isolated from the same patients. Our findings, confirmed by Huddleson, on all but a few of the more recent isolated strains, show 35 to be variety *suis* and 14 variety *abortus*.

On a few of the strains isolated early in our work agglutinin absorption tests were performed, and they were thus differentiated from the *melitensis* variety. When our epidemiological studies revealed that goats were not at all concerned in the disease in Iowa, the use of these tests in differentiation was discontinued. Pathogenicity studies were conducted on more than half of the isolated strains with the results indicated above. Of the 14 strains classified as *abortus*, only one strain grew on first subculture in air, the others requiring an increased carbon-dioxide tension. This cultural test and the bacteriostatic action of dyes were found to be of the greatest value in determining types.

We have related these strictly laboratory results to our epidemiological findings because of their significance, and reproduce here some of the important details. In general, it can be said that bovine types have their source in cattle, and porcine in hogs; but there is a fallacy in always assuming this. Eight cultures of the bovine variety were obtained from persons who had no direct contact with livestock, and it was assumed that the source of their infection was raw dairy products. Five others of this variety were from farmers in whose herds of cattle there were histories of abortion. Four of these herds were examined serologically, and in three, all, or a majority of the animals, were positive. One bovine organism was isolated from the operator of a rendering plant. He handled carcasses of cattle and hogs, used pasteurized milk and cream, but country-made butter. One organism of the *abortus* variety which grew on first subculture in air was obtained from a farmer's wife who had no contact with hogs, but who used milk freely from a cow with a history of abortion and a positive serum reaction.

Ten cultures of the *suis* variety were obtained from employees of packing plants who handled hog carcasses only. Certainly seven, and possibly all, of these men either used pasteurized milk and cream or none at all. Twenty cultures were from farmers or farmers' sons, all but one of whom had repeated contact with hogs. In five of these instances the hogs were serologically positive, and the cattle negative; in two instances both hogs and cattle were positive; in one case the hogs were negative and the cattle positive; in five cases the hogs were unexamined, while the cattle were negative in four herds, and positive in one. In six herds there were no serological examinations; in the one case of "no contact," the cattle were examined but gave only doubtful reactions.

Four cultures of the *suis* variety were obtained from farmers' wives. In the family of one of these the two male members of the family had had undulant fever, and both the cattle and hogs on the farm were found to be infected. In a second case the attending physician reported that the infection probably came from a herd of aborting hogs. The remaining two, an early and a late case, have not been investigated epidemiologically. The findings of laboratory and field studies for the most part run parallel, though in an occasional case infection seemed to have passed from hogs to cattle, and thence to man. That this may occur has been demonstrated by the fact that Huddleson (48) has isolated the porcine organism from cattle.

Though we are convinced that laboratory studies can accurately differentiate the varieties of *Brucella* the probable source of all infections must not be deduced from these alone, for two reasons: First, the *suis* organism may find its way to man through cattle; second, the *abortus* variety is relatively difficult to isolate. From 26

of our recent cases the first blood cultures, even after prolonged incubation, have failed to yield any organisms. A later culture from one of these patients, the source of whose infection was apparently in hogs, yielded a *suis* variety. In four others no opinion could be expressed as to the probable source; but in 21, epidemiological studies incriminated cattle. Here the following observation of Burnet (59) is of interest. "In goats infected with the *melitensis* variety, positive blood cultures are readily obtained (17 of 26 cultures on 11 goats), whereas from the *abortus* infected animal they are rarely obtained (1 of 26 cultures on 6 goats)." Our own observations show that human infections traced to hogs usually yield positive cultures, while those traced to cattle do so infrequently.

For reasons which will be obvious when the epidemiological data are considered, our findings do not coincide with those reported from other States and other countries. Kristensen (60) isolated 34 organisms from his cases in Denmark, but found none with porcine characteristics. Carpenter and King (61), Orr and Huddleson (62), and Simpson (63) have each expressed the opinion that the bovine type was chiefly concerned. Others have expressed the opinion that the *suis* variety alone is of danger to human beings. We, ourselves, are forced to the conclusion that both varieties are involved; and, in Iowa at least, our impression is that the *abortus* and *suis* varieties are about equally responsible for the undulant fever morbidity.

RELATIVE PATHOGENICITY FOR MAN

The *melitensis* and *suis* varieties of *Brucella* have been generally accepted as pathogenic for man, but there is still some question concerning the *abortus* variety. On account of the repeated isolation of this strain from persons suffering with undulant fever, it has become of importance to examine carefully the evidence presented. There is some ground for belief that the organism is only slightly infectious, possibly even nonpathogenic "except perhaps under unusual conditions still to be defined" (Theo. Smith (52)). "Our study of the disease shows clearly that *Br. abortus* is only slightly pathogenic for man and it must be that only the most virulent strains in milk are of danger to him," is the conclusion of Carpenter and King (61). Of the infection in Michigan, Orr and Huddleson (62) write: "This study reveals the fact that in a group of 500 individuals, equally divided into males and females, of all age groups, constantly exposed to the *abortus* organism through an infected milk supply, only 1.4 per cent showed evidence of infection with this organism and only 0.8 per cent showed any evidence of active infection. These results would indicate that among the human population susceptibility to infection with *Br. abortus*, bovine type, is very low, and that human infection is determined by some factor or factors as yet undetermined.

The low human susceptibility is, no doubt, responsible for the relatively low incidence of undulant fever."

We have commonly met with just such conclusions in the literature, and in conversation, as the result of both casual and detailed observations in practice or investigation. There are also reports of experiments in which individuals have been deliberately inoculated without developing undulant fever. Nicolle, Burnet, and Conseil (64) gave, by subcutaneous injection to five individuals, large doses of living *Br. melitensis* var. *abortus* and no clinical evidence of infection resulted. Burnet (65) even suggested that this living strain be used as a vaccine against infection with the *melitensis* variety. Otero (66), in Porto Rico, recently employed five volunteers to ingest in milk the 48-hour growth from one or more agar slants of *Br. melitensis* var. *abortus*. Two others similarly received *Br. melitensis* var. *suis*. In the first five no evidence of infection appeared, while in the latter two both clinical and laboratory evidence demonstrated undulant fever. Negative findings in this experiment can, however, be given little weight, as most, if not all, of the *abortus* strains had been carried on artificial media for a long period. In judging results of such experiments, the virulence of the strain used must be considered, as well as that of individual resistence—a factor scarcely measurable.

Similar experiments have been conducted by Huddleson (67) on monkeys. He found the *suis* variety produced a severe disease with rapid loss of weight and a fatal termination. The *abortus* variety gave rise to a mild infection, the animals showing few signs of disease and rapidly recovering. The *melitensis* variety he found to be less pathogenic than the *suis*. These results may at least suggest what occurs in human individuals.

We have examined from many angles the clinical records of Iowa patients from whom *Brucella* has been isolated, in an endeavor to determine the relative virulence of the two (*abortus* and *suis*) varieties for man. Those patients from whom an organism has been isolated have been divided, according to the severity and duration of their symptoms, into four categories, as follows: (I) Fatal; (II) severe or moderately severe; (III) mild; (IV) ambulatory. From each of three fatal cases a *suis* variety was isolated—from one of them, an *abortus* as well. From the 28 in the second category, 23 *suis* and 5 *abortus* cultures were obtained. The mild cases yielded 4 *suis* and 3 *abortus*, and the ambulatory 3 *suis* and 5 *abortus* strains. Thus 8 of the 14 *abortus* strains were derived from mild and ambulatory infections, while 26 of the 33 *suis* strains were from severe or fatal cases.

Further, we have classified the information pertaining to those patients who apparently derived their infection from one definite source—either cattle or hogs. This group includes the following:

(1) Those persons who had no direct contact with livestock but used raw dairy products; (2) the employees in packing houses whose contact was only with hogs and who used pasteurized dairy products exclusively, or chiefly; (3) those farmers whose stock had been examined and in which the infection was confined to either cattle or hogs. (In making deductions from these data some infrequent errors have perhaps occurred, but not of sufficient weight to influence our conclusions.)

Among the cases in this last group the source of which was attributable to hogs, 2 were fatal cases, 19 severe or moderately severe, 5 mild, and 8 ambulatory. Among those the source of which was attributable to cattle, 1 was fatal, 33 were severe or moderately severe, 36 mild, and 25 ambulatory. Presenting this in another way, 70 per cent of the infections known or presumed to be caused by the *suis* variety were moderately severe, severe, or fatal, and 30 per cent were mild or ambulatory; of those known or presumed to be caused by the *abortus* variety, 36 per cent were moderately severe, severe, or fatal, 36 per cent were mild, and 28 per cent ambulatory. We are able to say, then, that infections of *Br. melitensis* var. *suis* tend to be more severe than those of *Br. melitensis* var. *abortus*, though in individual cases one can not tell from clinical characteristics which variety might be involved. There are not, in human beings, as was found by Huddleson (67) in monkeys, constant differences in the degree of severity. Questions as to whether or not all strains of these varieties are pathogenic for man, and as to why strains of these organisms differ in virulence, remain as yet unanswered.

BACTERIOLOGICAL PROCEDURES

In the bacteriological study of *Brucella* infections certain modifications of the general technique of blood, urine, and stool cultures must be followed. These are here briefly noted.

Blood cultures.—Prolonged incubation is of first importance. Broth cultures occasionally reveal growth on the fourth day, if a subculture is made; but it may be the third or fourth week before the organisms have multiplied sufficiently to be evident if subcultures are not made. Particularly is this true if the *abortus* variety is involved. We have adopted and recommend the plan of incubating broth cultures for four weeks with subcultures at semiweekly intervals, before finally reporting "no growth."

Emphasis is also given to the necessity of modifying the atmosphere by increasing the carbon-dioxide content to approximately 10 per cent. This is particularly essential for the first subculture, as scarcely any strains of the *abortus* variety will begin their growth on solid media in an ordinary atmosphere, though they may grow slowly in broth. The *suis* variety, on the other hand, grows more luxuriantly in air. All subcultures, therefore, should be made in duplicate,

one to be incubated in air, the other in a sealed jar containing 10 per cent carbon dioxide by volume. In hospital laboratories it is recommended that two blood cultures be taken, in broth, from the patient, so that the double incubation process may be carried out.

The *Brucellae* may be grown successfully in various enriched media. We have found fresh beef liver infusion broth and agar, with a pH of 6.6, most satisfactory (Huddleson (68)).

As only a small percentage of persons with undulant fever are cared for in hospitals, and as much additional information concerning the infection is obtained in the study of isolated organisms, a procedure for hæmoculture which may be used by general practitioners or in field studies is of much practical importance. For this purpose, we

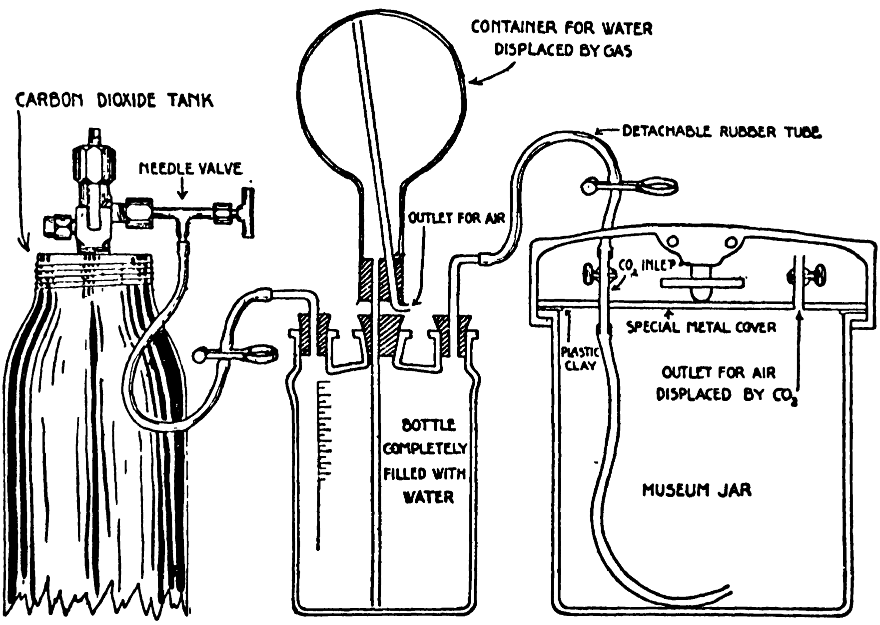

FIGURE 2.—Apparatus used in obtaining an atmosphere with carbon dioxide approximately 10 per cent by volume

supply media in tall thick glass bottles—the commercial oil sample bottles are cheap and satisfactory—equipped with a rubber stopper having a collar which fits snugly over the expanded rim of the bottle. It is the practice to send this blood culture outfit to the physician with the first positive report on an agglutination test. Directions as to inoculation are supplied—10 cubic centimeters of blood to be collected and inoculated into the medium under strict aseptic precautions. If possible, the culture is to be incubated for four to five days before it is shipped to the laboratory for study. This may be done in a near-by hospital or in a private laboratory; chicken incubators have also been used. After the culture has been received at the laboratory, subcultures are made as outlined above. The preliminary period of incubation before shipping the cultures is quite important; in our earlier

work when this was not done, cultures rarely yielded positive findings. The chief drawback in the method is that an unduly high proportion of the cultures taken by general practitioners show on first subcultures a growth of some common contaminant. The proportion of positive findings does, however, justify this attempt to obtain at least one culture from each person infected. In the field investigation of cases we have obtained blood cultures which were handled as described above, and in addition, have inoculated guinea pigs with whole blood from the patient. We believe the latter to be the method of choice, if one can not begin the incubation of a culture within a few hours.

The isolation of organisms from the clots of blood sent for agglutination tests was also attempted. While others have reported success, our results were uniformly negative. Guinea pigs inoculated with the clots of 35 blood specimens giving positive serum agglutination of *Brucella*, failed in every instance to develop infection, though from some of the patients, positive blood cultures were obtained later by the method which has been described.

Urine cultures.—We have made some attempts at isolating the organism from urine, but without positive results. A specimen, obtained by catheter, may be centrifugated or agglutinated (Amoss (69)) to procure a sediment, which should be inoculated on solid medium. Guinea pig inoculation should produce a higher proportion of positive results.

Stool cultures.—The method used for the isolation of *Brucella* from feces is described by Amoss and Poston (69). To a dilute suspension of feces from which the coarser particles have been removed, there is added an amount of positive immune serum adequate to produce agglutination. After two hours' incubation the clumps are thrown down by centrifugation. The sediment is washed in saline solution three or more times and inoculation is then made on solid medium. The eosin-methylene blue medium as used in the isolation of *B. typhosus* was adovcated, but we found that few of our strains of *Brucella* would grow on it. By the addition of fresh beef liver infusion and the adjusting of the pH to 6.6, growth is usually obtained. A similar observation has been reported by Otero (66). Growth appears in 72 hours as very small translucent colonies. These may be picked to other media and further studied.

Guinea pig inoculation.—The isolation of *Brucella* is often possible only through animal inoculation, guinea pigs being most satisfactory. Whole blood may be given intraperitoneally, while sputum or the sediment from urine or feces is best injected subcutaneously in the groin. The organism may be isolated from milk by injecting 2.5 cubic centimeters of the naturally separated cream subcutaneously in each groin. An agglutination test may be performed after four

weeks on serum separated from blood removed from the test animal by intracardiac puncture. Positive animals are sacrificed between the sixth and eighth weeks. With aseptic precautions, the spleen, liver, and any enlarged lymph glands are removed. If the cut surface of these organs is smeared on solid media, growth of *Brucella* usually results. If one animal only has been infected, or if from the first of two the organism was not isolated, a portion of macerated spleen is injected into two other pigs. In this way positive results are almost invariably obtained.

SEROLOGICAL PROCEDURES

The test for agglutinins for *Brucella* in body fluids is now generally used as an aid in determining the presence or absence of infection. In checking the findings of other laboratories, we have occasionally encountered marked discrepancies in agglutination titers as determined by the usual test. Certain conditions must obtain in order to secure comparable and consistent results. A discussion of these with comments on common sources of error, follows:

Variation in the agglutinability of different strains of *Brucella* has been suggested as a possible explanation for discrepancies in findings. We tested 46 of our strains, including both *abortus* and *suis* varieties, using a pooled bovine and one porcine serum, and found no variations in the titer of more than one serum dilution, a difference within the limits of experimental error. Moreover, we were unable to detect any difference relative to the specific variety of antigen or antisera. In testing sera from patients, using a variety *melitensis* antigen, we observed slightly lower titers than were obtained when the *abortus* or *suis* antigen was used. Even here, however, the differences were inconstant and slight, rarely more than one dilution in the series. Occasionally we encountered a recently isolated strain which resisted agglutination until after the fourth subculture; but excluding these, there has been no significant difference in the agglutination titer which has been due to variations in the agglutinability of the organism used in the preparation of the antigen.

Differences in the density of the antigen used do, however, often explain discrepancies in findings. As an experiment, take a moderately concentrated antigen and dilute this in series so that each dilution is but one-half the density of the previous one in the series. Then, using one serum, set up an agglutination test with each of these dilutions of antigen. The following is one of our protocols recording only complete agglutinations:

Density of antigen:	Agglutination titer
2,000 parts per million	1:80
1,000 parts per million	1:160
500 parts per million	1:320
250 parts per million	1:640
125 parts per million	1:1280

One observes, therefore, that within certain limits, doubling the dilution of the antigen, doubles the final titer.

In measuring density of the antigen the method generally adopted is the comparison of the suspension with one of the turbidity standards. We have used as a standard the one described in the "Standard Methods of Water Analysis." The McFarlane nephalometer is similar, but the opaque substance used is barium sulphate, not Fullers' earth. Since in the employment of these standards, turbidity can only be estimated and not accurately measured, we have attributed slight variations in agglutination titer as being dependent on inaccuracies in adjusting the density of the antigen. Six different dilutions of a stock antigen were made by two of us and tests set up, using one serum with these 12 dilutions of antigen. Observing complete agglutination alone, all titers were identical; and reading partial agglutination there was slight variation only. This method of estimating the density of antigens, has, therefore, been satisfactory. If agglutination tests are read at intervals, one finds that there is a progressive increase in titer up to about 48 hours. The rapidity of agglutination varies with different sera, and this increase in titer from 2 to 48 hours may be slight or it may be marked. To obtain consistent results the same interval must be allowed.

In the incubation of tests, different temperatures have been used by different workers. Sera have also been examined after inactivation and without inactivation. Any variation in titers dependent on these differences in procedure we have found to be slight and inconstant. Tests of unheated sera, incubated at a temperature of 37° C. often give slightly higher titers than do corresponding inactivated sera similarly examined, but complete agglutination in low titers (1:5 to 1:20) is frequently revealed by the inactivated sera only. Tests incubated at 56° give final titers which closely parallel those on inactivated sera incubated at 37° C.

The influence of different preservatives on the agglutinability of *Brucella* has been studied by Huddleson (70). Tricresol 0.1 per cent and formalin in concentrations higher than 0.5 per cent somewhat inhibited agglutination, while neither phenol, formalin, nor ether in concentrations below 0.5 per cent caused inhibition.

Occasionally a marked zone phenomenon is observed. Serum in dilutions of 1:80 or even 1:160 may show no agglutination, while in higher dilutions clear-cut reactions may occur. To avoid errors, therefore, sera must be examined in high as well as in low dilutions.

In connection with the work of the committee on contagious abortion of the National Research Council, one of us (A. V. H.) obtained data from most of the State laboratories concerning the procedure routinely used in performing agglutination tests for undulant fever. Antigens were also submitted to us for study. Wide

differences were found; for example, the densities of the antigens ranged from well under 100 parts per million to 1,000 parts per million, and the period of incubation of the tests varied from 2 to 48 hours. The titers obtained when these different procedures were followed were, as expected, also variable. Using the same serum for all, one antigen failed to show agglutination except in low dilutions; but omitting this one the low titer was 1:320, the high 1:5120. Most, however, were in the range of 1:320 to 1:1280. To obtain comparable or even reliable results this serological procedure should be carried out according to one standard. We feel that there should be general agreement on certain points, as follows: (1) The final density of the antigen in the test should be 500 parts per million; (2) the reading should be recorded after 24 hours, preferably 4 hours of incubation at 37° C. and 16 hours in the refrigerator at from 5° to 10° C.; (3) in reporting a maximum titer only complete or almost complete agglutination should be read.

Other serological procedures are sometimes used. The microscopic agglutination test, performed on dried blood specimens, is often used as a qualitative test. The rapid method of Huddleson (71) is a simple procedure, particularly useful where large numbers of sera must be examined. Complement fixation has been used by Kristensen (60), who found its chief value to be in checking agglutination findings. The results of the tests were not strictly parallel, as some sera strongly positive by the agglutination test were negative by complement fixation, and vice versa.

SIGNIFICANCE OF BRUCELLA AGGLUTININS IN HUMAN SERA

Many workers in different localities have sought light on the significance of *Brucella* agglutinins in human sera by a study of the blood samples submitted for the Wassermann test. Unfortunately, wide variations in technique prohibit a successful comparison of results. In our laboratories a similar study has included the following groups of specimens: (1) Routine Wassermann sera; (2) a series of Wassermann specimens sent to us from the Chicago laboratories through the kindness of Doctor Tonney; (3) all samples sent to us for the Widal test; (4) the sera of 120 apparently healthy Iowa veterinarians; (5) sera from more than 200 packing-house employees; and (6) 138 samples collected at random from inmates of the Iowa tuberculosis sanitarium, the milk supply of which is from a herd known to be heavily infected with *Brucella*. Our observations are shown in Table 1, which is taken in part from the thesis of Miss Thelma DeCapito, whose work was conducted in our laboratories. In reading the tests, only complete or almost complete agglutination was considered.

TABLE 1.—*Brucella agglutinins in the sera of selected groups*

Source of sera	Iowa				Chicago		Iowa					
	Routine Wassermann		Routine Widals, excluding sera from patients found to have undulant fever		Routine Wassermann		Apparently healthy veterinarians		Inmates of tuberculosis sanitorium who used freely raw milk from infected cows		Apparently healthy packing-house employees	
Titer	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Negatives	573	57.3	212	62.4	357	90.4	84	70.0	225	70.3	150	69.0
1:5	194	19.4	44	12.9	23	5.8	6	5.0	32	10.0	------	------
1:10	130	13.0	65	19.1	9	2.3	16	13.3	32	10.0	10	4.6
1:20	90	9.0	15	4.4	6	1.5	9	7.5	11	3.4	17	8.0
1:40	11	1.1	4	1.2	0	0	5	4.2	10	3.1	10	4.6
1:80	1	.1	0	0	0	0	0	0	1	.3	5	2.3
1:160	1	.1	0	0	0	0	0	0	5	1.6	10	4.6
1:320	0	0	0	0	0	0	0	0	3	1.0	6	2.8
1:640	0	0	0	0	0	0	0	0	1	.3	4	1.8
1:1280	0	0	0	0	0	0	0	0	0	0	2	1.0
1:2500	0	0	0	0	0	0	0	0	0	0	3	1.3
Total	1,000	100.0	340	100.0	395	100.0	120	100.0	320	100.0	217	100.0

The high proportion of positive sera from persons in Iowa is apparent. Those exposed through the ingestion of large amounts of raw milk from infected cows and those who handle fresh pork showed the highest titers. The veterinarians showed slightly higher titers than the general population. That subclinical or very mild infections were responsible for the higher titers among the groups seems indisputable, since an organism of the *abortus* variety was isolated from the blood stream of such an individual (a patient at the sanitarium) showing no clinical signs of undulant fever.

Since our first report (72) of a study of employees of packing houses we have had opportunity to examine specimens from 33 men, working in a plant which handled cattle as well as hogs. One only (3 per cent) showed agglutination in a titer above 1:80.

Contact, using this term in its broadest sense, with living *Brucella* seems responsible for the low titers found; we think it probable that a generalized infection ordinarily produces agglutination in high titer (1:80 or higher). Carpenter, Boak, and Chapman (73) have concluded, as the result of definite purposeful experiments, that abortus agglutinins are not passively absorbed through the gastrointestinal tract, but are actively produced following invasion of the tissues by the organism. It seems probable that *Brucella* may establish itself in some *locus* in the human body, and stimulate antibody production apart from any manifestation of disease.

The question of the persistence of agglutinins in the blood stream after an attack of fever is an interesting one. We have examined blood sera from 45 of our patients, collected 12 or more months after

the illness had been first diagnosed. Of these, 15 failed to show any agglutination in dilutions above 1:20. In five other cases the sera became negative in from three to nine months. Thirty still showed agglutinins in titers of 1:40 or higher after 12 months, but in 29 of these the findings indicated a marked reduction of titer. The thirtieth was a case of prolonged infection. Three men have had persisting titers of 1:80 and 1:160 for several months; but two of these were packing-house employees and reinfection may have occurred. On the whole, the tendency seems to be for specific agglutinins to disappear rapidly following clinical recovery from undulant fever.

Cases of febrile illnesses resembling undulant fever, but lacking *Brucella* agglutinins, have been reported. Indeed, Carpenter, Boak, and Chapman (73) record three such cases from which they isolated the *abortus* organism and at least one suffered from typical undulant fever. We have had little opportunity to study cases of this nature, though a few have been observed. Possibly here the complement fixation test or the skin test might be of value, especially if repeated agglutination tests at various time intervals continue to be negative.

In the clinical interpretation of agglutination findings, therefore, one must bear in mind these facts: (1) Mild or subclinical *Brucella* infection with production of agglutinins does occur, at times associated with other diseases; (2) specific agglutinins may sometimes persist in the blood stream for more than one year after clinical recovery from undulant fever; (3) infection, even severe infection may occasionally occur without any production of demonstrable agglutinins. In general, however, we believe the following interpretation holds: Titers below 1:40 are of slight clinical significance; 1:40, of doubtful significance; 1:80, weakly positive; 1:160 and 1:320, positive; 1:640 and above, strongly positive.

IV. BRUCELLA ABORTUS INFECTION IN ANIMALS

A STUDY OF HERDS IN IOWA

The general nature of the disease in guinea pigs produced by the *abortus* and *suis* varieties of *Br. melitensis* has already been mentioned. The gross changes and the microscopic lesions are shown in Figures 3 to 8.

The nature of the infection in domestic animals is here discussed, since a better understanding of the epidemiology of undulant fever may thereby be obtained. The pathologic findings and related signs have been summarized and are shown in Figure 9. Little study has as yet been given to hogs; but from our epidemiological data we are led to believe that in these animals the infection is disseminated and that the organisms are excreted in the urine and probably also in the feces. These assumptions are as yet lacking proof.

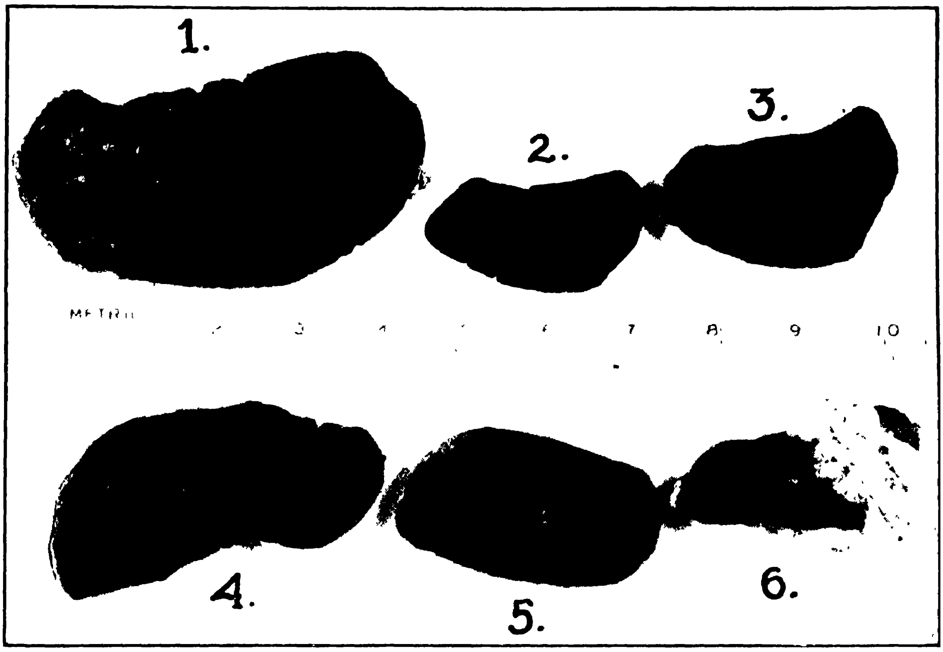

FIGURE 3. Gross lesions in the spleen of guinea pigs infected with *Brucella*. (Pigs were between 400 and 600 grams in weight and were killed during the sixth, seventh, or eighth week of the disease.) The infections were caused by the following organisms: 1, *Br. melitensis* var. *suis*, strain S, human origin; 2, spleen of uninfected pig; 3, *Br. melitensis* var. *abortus*, strain P, human origin; 4, *Br. melitensis* var. *abortus*, strain from cow; 5, *Br. melitensis* var. *suis*, strain K, human origin; 6, *Br. melitensis* var. *suis*, strain S, human origin

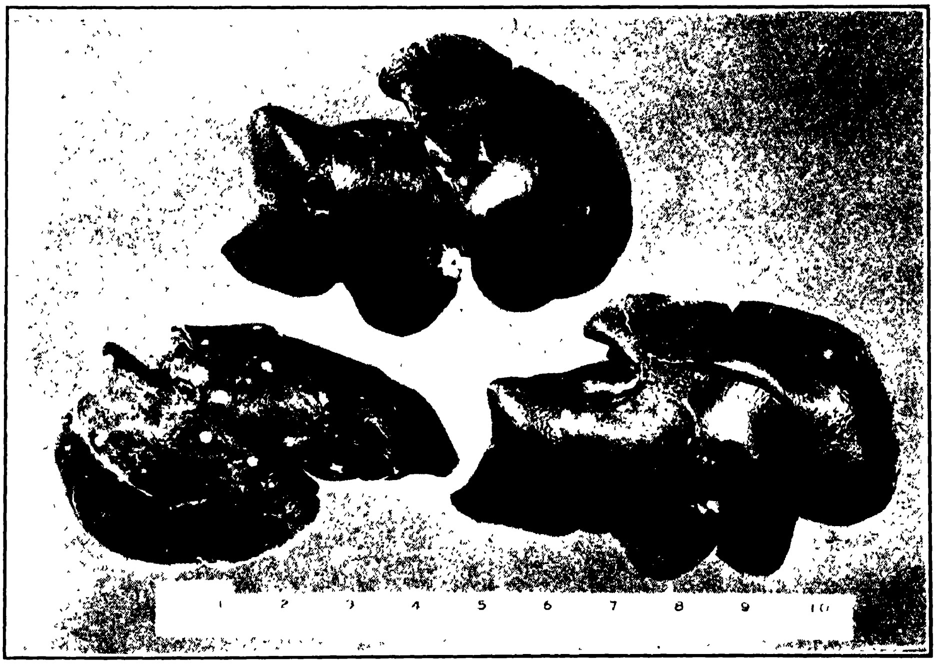

FIGURE 4.—Gross lesions in the livers of guinea pigs infected with *Brucella*. (The animals were similar in size and were killed at a similar period of the disease) Nos. 1 and 2 were both infected with var. *suis*, strain S, of human origin. One showed large abscesses, but in the other there were only a very few small ones. No. 3 was from an animal infected with the *abortus* variety, and showed only microscopic lesions

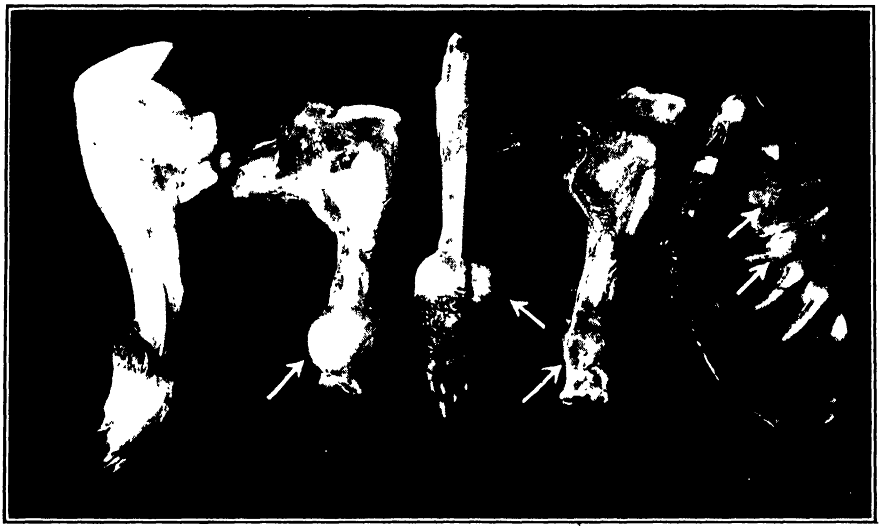

FIGURE 5.—Joint lesions characteristic of *Br. melitensis* var. *suis* infection in guinea pigs

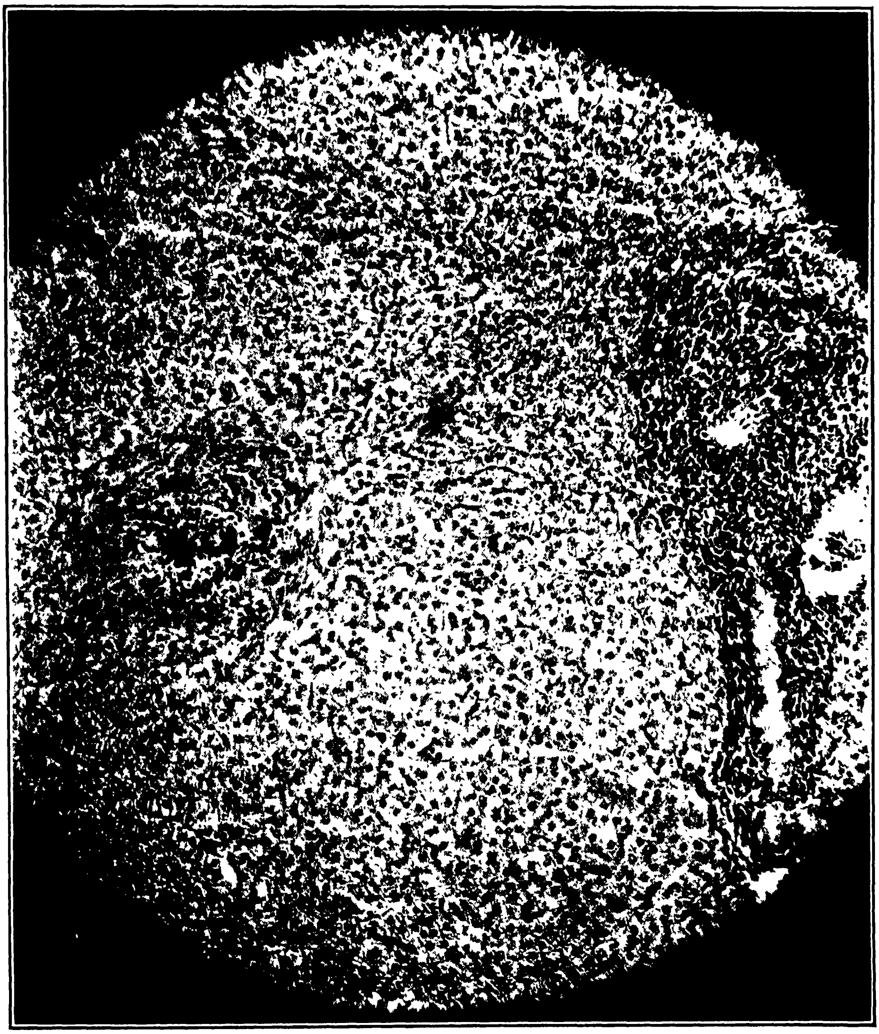

FIGURE 6.—A "tubercle" in the liver of a guinea pig infected with *Brucella*

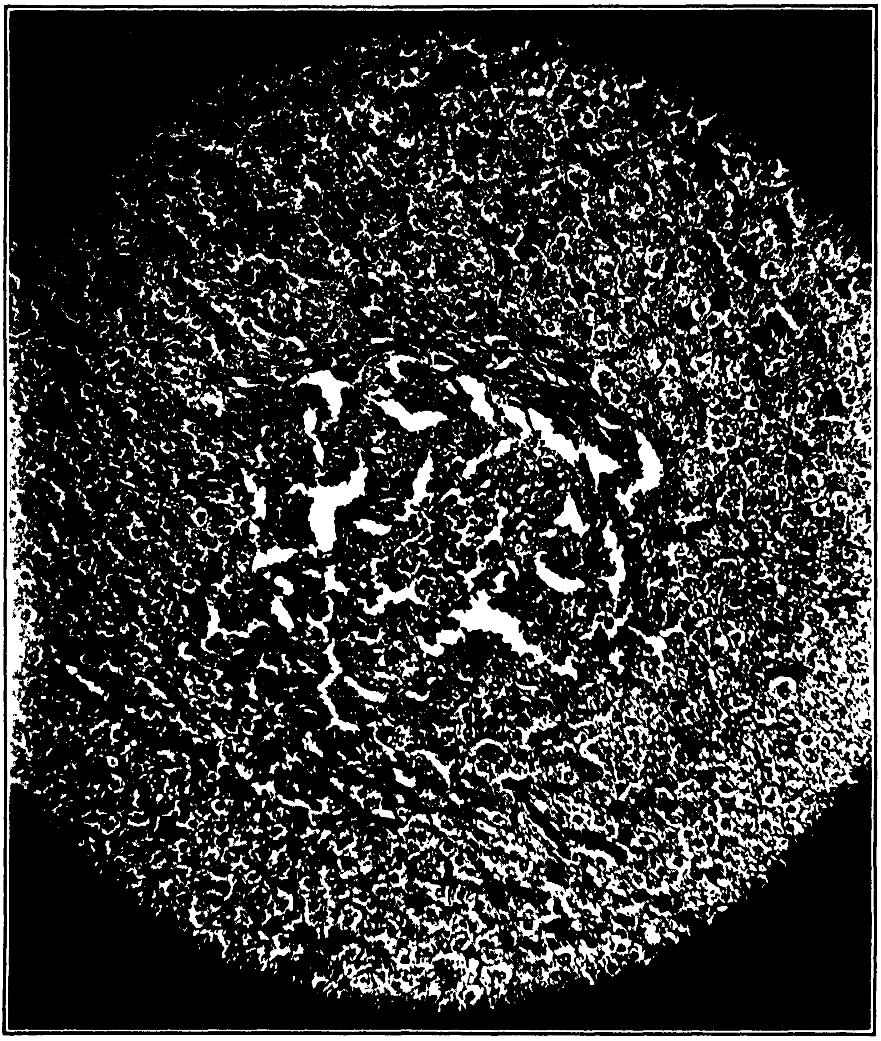

FIGURE 7.—Microscopic abscess in the liver of a guinea pig infected with *Brucella*

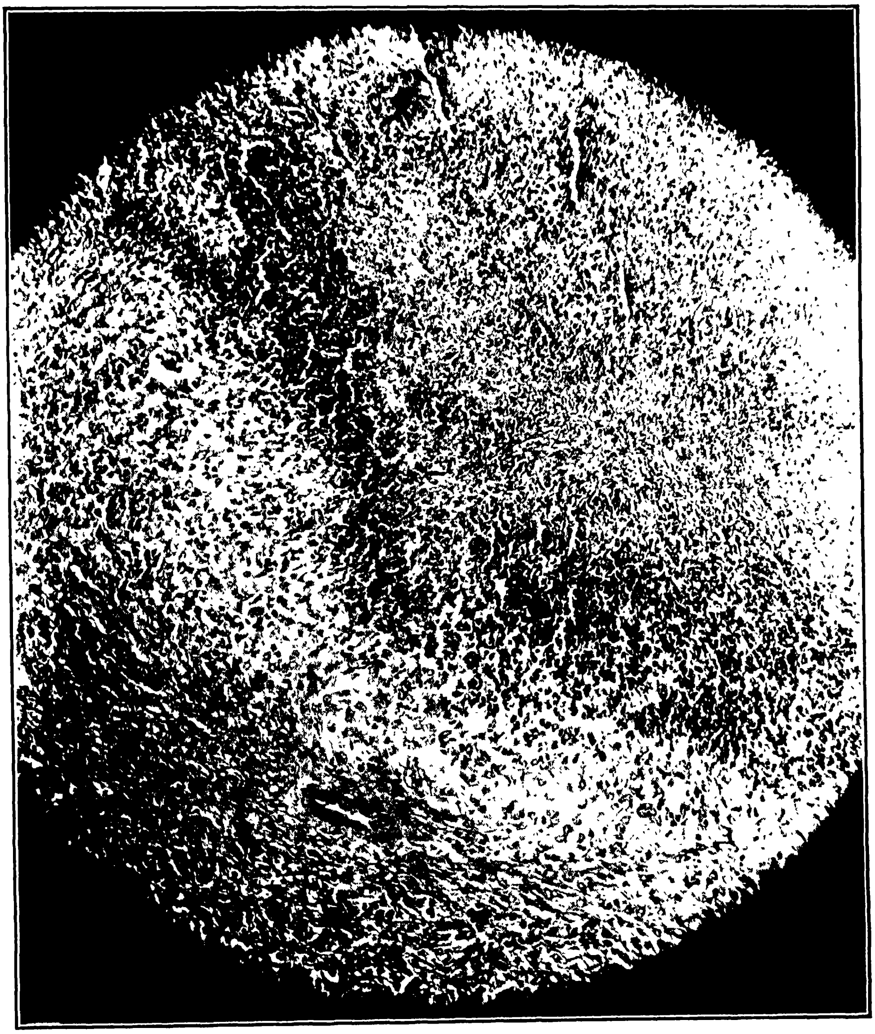

FIGURE 8.—Large abscess in the spleen of a guinea pig infected with *Brucella*

In connection with our study of the possible sources of infection, we have obtained data on 164 herds of cattle and 120 herds of hogs. We have also examined serologically 1,300 cattle from 123 herds and 611 hogs from 60 herds. A majority of these animals have also been tested by Dr. Chas. Murray, professor of veterinary investigation of Iowa State College, Ames, Iowa, and his staff. The findings in the two laboratories have been compared and notable discrepancies checked. Throughout, the titers in our laboratory have been somewhat lower than those obtained by Doctor Murray, due presumably to the more dilute antigen used at Ames. The herd histories were obtained at the time of the epidemiological investigation. On cattle, information was sought concerning abortions, retained placentæ, sterility, and calves dying shortly after birth; on hogs, concerning abortions, sterility, the birth of undeveloped dead pigs with litters, and the occurrence of an undue number of small litters. Multiple abortions in

DOMESTIC ANIMALS

FINDINGS	RELATED SIGNS
PREGNANT UTERUS CHORINITIS, PLACENTITIS, ENDOMETRITIS — LOCALIZED TO EXTENSIVE — ACUTE, SUBACUTE OR CHRONIC	ABORTIONS, PREMATURE BIRTHS RETAINED PLACENTAE, STERILITY, OR COMPLETE ABSENCE OF ALL SIGNS
UDDER CHRONIC INFLAMMATORY FOCI OF MICROSCOPIC SIZE	LABORATORY SIGNS ORGANISMS PRESENT IN THE MILK AND AN INCREASE IN THE CELL COUNT
OTHER ORGANS NO LESIONS IN THE GROSS	ORGANISMS IN SOME ANIMALS EXCRETED IN THE URINE

FIGURE 9.—Summary of pathologic findings and related signs of *Brucella* infection in domestic animals

large herds or a single abortion in a small herd, of either cows or sows, was regarded, for purposes of tabulation, as a positive herd history. The other signs, unaccompanied by abortion, were regarded as constituting a suspicious herd history. The absence of any of these signs was accepted as a negative herd history. In some instances we failed to obtain or record any details of the herd history. This is especially true of the hogs, since earlier in the study particular attention was given to cattle.

TABLE 2.—*Comparison of herd histories of cattle with the serological findings*

History	Serologically positive	Serologically suspicious	Serologically negative	No serological examination	Total
Positive	48	3	5	23	79
Suspicious	14	7	13	4	38
Negative	13	4	13	14	44
Unrecorded	3	0	0	----------	3
Total	78	14	31	41	164

TABLE 3.—*Comparison of herd histories of hogs with the serological findings*

History	Serologically positive	Serologically suspicious	Serologically negative	No serological examination	Total
Positive	11	3	3	17	34
Suspicious	3	6	0	7	16
Negative	8	8	14	36	66
Unrecorded	2	0	2		4
Total	24	17	19	60	120

In Tables 2 and 3 are shown comparisons of the herd history and the serological findings. When one or more specimens gave complete agglutination in 1:40 dilution but not higher, the herd was classified as suspicious serologically. If the titer was 1:80 or higher, the herd was regarded as positive serologically. Only in the later work have we insisted on the procuring of blood specimens from hogs. Veterinarians are accustomed to drawing blood from cattle; but they frequently omitted collecting porcine blood, because of the difficulty of restraining these animals, or because of lack of cooperation on the part of the farmer. In some instances the hogs had already been sold. For these reasons, the information regarding hogs is less extensive than that regarding cattle. It is felt, however, that the data show clearly the unreliability of herd histories of hogs, as a means of detecting *Brucella* infection. Sixteen herds with completely negative histories were found to be either positive or suspicious serologically. In only 11 of the 24 herds which showed positive reactors was the history positive (two herd histories were unrecorded). The suspicious or positive histories must, however, be given much weight, since but three herds in this group gave negative serological findings. Negative herd histories of cattle may also be misleading, particularly where the past history of all the herd is not known, as for example, where animals have been recently purchased. Positive histories here may also be given much weight, while suspicious histories are rather unreliable.

The proportion of positive animals in individual herds was found to be variable. In some small herds all were infected and in several large herds no more than one animal was serologically positive. Of the total of 1,300 cattle, 339 (26 per cent) were positive, 105 (8 per cent) doubtful, and 856 (66 per cent) negative; and of the 611 hogs, 109 (18 per cent) were positive, 96 (16 per cent) doubtful, and 406 (66 per cent) negative. One is particularly impressed with the relatively large number of hog specimens reacting in a suspicious or doubtful titer only. It may be mentioned that a goodly proportion of these doubtful hog specimens were classified as positive by Doctor Murray.

Additional observations are necessary in order to determine the true significance of these doubtful reactions.

In determining the presence or absence of infection in a herd the history is of value; but on account of the fact that a single infected animal so often displays no clinical signs of disease, only laboratory procedures are of avail in finding the status in regard to *Brucella* infection of individuals in the herd. For practical purposes the agglutination test is reliable, although animals occasionally harbor *Brucella* without showing agglutinins.

The actual incidence of infection among domestic livestock is unknown, though various estimates have been offered by different workers. Among cattle, contagious abortion is recognized as being widespread, involving, as has been reported, as high as 80 to 90 per cent of the herds in some localities. Little attention has heretofore been given to the infection among hogs, since the economic loss through abortion is not great, but certainly in Iowa the disease is not of infrequent occurrence. Attention has recently been called by Fitch (74) to an unusual manifestation of this infection in horses, and by Huddleson (75) to the fact that chickens are susceptible. We have examined one bitch which aborted, and found her infected. In seeking the source of *Brucella* infection in human beings, therefore, one can not confine his attention to one species of domestic animals.

Particular emphasis has been given by others to the excretion of *Brucella* in the milk of infected cows. The organism can not be isolated from all which show positive serum agglutination. Schroeder and Cotton (42) isolated *Br. abortus* from 83.5 per cent of serologically positive cows, and Carpenter (76) from 66 per cent of those which had either aborted or had retained placenta at least once during the three previous gestations. However, the organisms are rarely found in more than small numbers—a contrast to the condition in infected goats, whose milk is often heavily contaminated. In mixed milk from one or more herds having some infected animals, the factor of dilution must be of importance in reducing the danger to the consumer of such milk in the raw state.

V. EPIDEMIOLOGY

GENERAL

The factors which determine the transmission of a particular disease from animal to man are dependent, in different localities, on (1) the incidence of the infection among animals, and (2) the degree of man's exposure, either direct or indirect. Variations in the habits and occupations of the people and their relation to animal industries, provide different contacts. For these reasons epidemiological studies on the same disease in different States or countries may bring different

facts to light. Herein lies the value of intensive local studies, as each may make a contribution to the general knowledge, which of necessity must be compounded of fragments gathered here and there. From the study reported here it is obvious that our error would have been tremendous, had we been content to assume that those factors which operated in the transmission of undulant fever on the island of Malta were solely responsible here. Also, had we only the findings of Kristensen in Denmark or even of Simpson in Ohio to rely upon, the source of many of our cases would remain obscure. These facts should stimulate independent studies of *Brucella* infection in all parts of the country, particularly as so much valuable material is at hand, and so many phenomena relating to the disease are as yet not clear. We present, in order, the findings in the State of Iowa; a summary of the findings from other States as far as they are available; and a review of the work of Kristensen in Denmark.

EPIDEMIOLOGICAL FINDINGS IN IOWA

A preliminary report on this subject has been presented by one of us (A. V. H. (77)). Since it was submitted we have collected data on nearly 300 additional cases, this report being based on a total of 375 patients. From time to time tabulations have been made with quite consistent findings. We feel, therefore, that on many points we have an accurate knowledge of the situation in Iowa. Other aspects, however, call for additional study. Some of the later findings have already been mentioned in another paper (78), but we shall here present a summary of all the epidemiological data relative to this State.

Iowa is primarily an agricultural State, although but 42.5 per cent of the population live on farms. The chief animal industry is hog raising, in which Iowa leads all other States. Within the State are large packing plants, some handling hogs exclusively. Dairying is also an important industry. There are very few goats in the State, and herds of sheep are quite scattered. It is known that *Brucella* infection is widespread in Iowa in both cattle and hogs, but the actual incidence has not been determined. Infection among goats has never been reported or detected in Iowa and we have no definite evidence that sheep are involved. Pasteurization of public milk supplies has not been widely adopted in the State; only in the two largest cities is more than 50 per cent of the milk and cream pasteurized. In the smaller cities and towns the use of raw milk is the rule. It is required that all cream used in the commercial manufacture of butter be pasteurized, and this is usually performed at a higher temperature than is used for other dairy products. From these facts it is apparent that an investigation of *Brucella* infection in this State offers an unusual opportunity to study comparatively the bovine and porcine types of disease, and their transmission from animals to man.

Our procedure in conducting the investigation in Iowa has already been detailed. We are confident that we have records of nearly all of the cases in the State in which a diagnosis of undulant fever has been substantiated by laboratory findings. On recent, as well as on a few of the early cases, our data are incomplete; but for these we are including and presenting such information as we have.

In the study of the animals we are particularly indebted to Dr. P. Malcolm, chief of the bureau of animal industry of the State department of agriculture, and Dr. Charles Murray, professor of veterinary investigation at Iowa State College.

Prevalence.—The number of recognized cases of undulant fever has continued to increase. The first case was diagnosed by Woodward (79) in 1926. In 1927 there were 42 cases; in 1928, 120; in

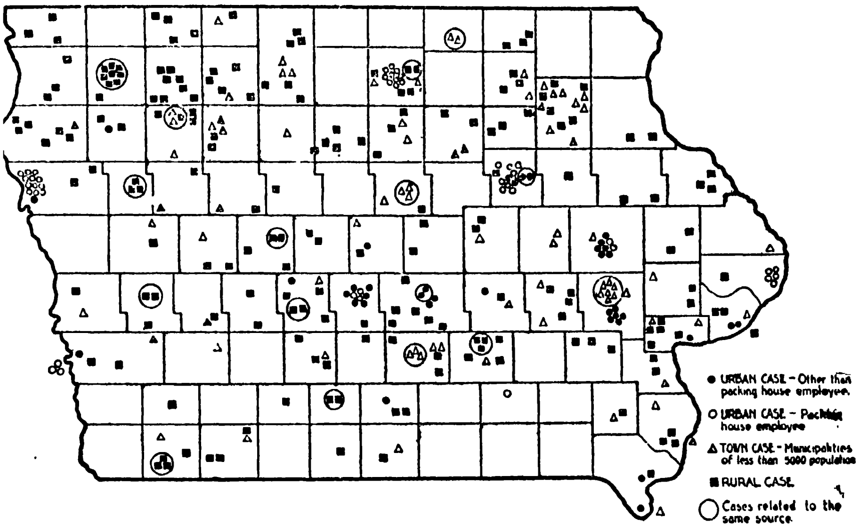

FIGURE 10.—Distribution of cases of undulant fever in Iowa

1929, 204; and the number occurring during the first two months of 1930 shows an increase over the same period in preceding years. Though we know that the true incidence is still undetermined, we believe that most of the severe or prolonged infections are now being accurately diagnosed. The annual number of cases will undoubtedly show some increase, but this will probably result chiefly from the diagnosis of more of the milder infections. During 1929 there was, on the average, one case per 12,000 population, and several of these cases were relatively mild infections. The graver forms of the disease have been of infrequent occurrence. As a general health hazard, therefore, this infection is not of major importance.

Distribution.—The cases occurred sporadically, scattered in practically every county of the State, as is shown in Figure 10. In 10 instances more than one case occurred in the same household; in

three there were three cases; in one the entire family—father, mother, and six children under 9 years of age—was infected (Appendix A, case 11 A). In five other instances, two or more cases appeared to be related to the same source. There have been 37 cases among the employees of the eight large packing plants in the State.

TABLE 4.—*Distribution by age groups of the Iowa cases on whom the necessary data were available*

Age	Total	Males	Females	Cases having had contact with livestock or carcasses	Cases having had no contact with livestock or carcasses
0-4	4	2	2	0	4
5-9	8	5	3	0	8
10-14	15	10	5	5	10
15-19	27	22	5	12	14
20-24	43	41	2	32	8
25-29	42	34	8	28	12
30-34	41	31	10	28	12
35-39	58	50	8	39	13
40-44	43	34	9	26	15
45-49	25	20	5	16	7
50-54	24	16	8	14	8
55-59	5	2	3	1	4
60-64	9	5	4	3	6
65-69	5	3	2	2	2
70-74	3	2	1	1	2
75-79	2	0	2	2	0
Total	354	277	77	209	125

Occupation.—The distribution according to occupation was as follows: Farmers (including sons and farm laborers), 162 (44.7 per cent); women on farms, 24 (6.6 per cent); stock buyers, 5 (1.4 per cent); packing-house employees, 37 (10.2 per cent); butchers, 2 (0.55 pe- cent); housewives (other than farmers' wives), 37 (10.2 per cent); students, 18 (4.9 per cent); children, 19 (5.3 per cent); professional and business persons and laborers, 58 (16 per cent).

Sex.—Of a total of 375 cases, 289 (77 per cent) were males and 86 (23 per cent) were females. Among 186 adults living on farms, 162 (87 per cent) were males, and 24 (13 per cent) were females. The preponderance of males is striking, and the proportions have been very uniform throughout our study. In the various tabulations which have been made, the percentage of males in the total cases has always been within the range of 76 to 79. However, in a group of 125 cases, among persons who had no direct contact with livestock or carcasses, 64 (51 per cent) were males and 61 (49 per cent) were females. (See fig. 11.) One can not assume, therefore, that males are more susceptible than females, since under similar conditions equal numbers are infected. However, in a large portion of the population in which the occupation involves contact with livestock or fresh meat the number of males greatly exceeds the number of females. This evidence seems to indicate that the proportion of males to females

is dependent upon direct contact exposure with livestock or fresh meats.

Age.—Distribution of our cases by age is shown in Table 4 and Figure 12. The large number of cases among young and middle-aged adult males very clearly appears to be dependent upon occupation.

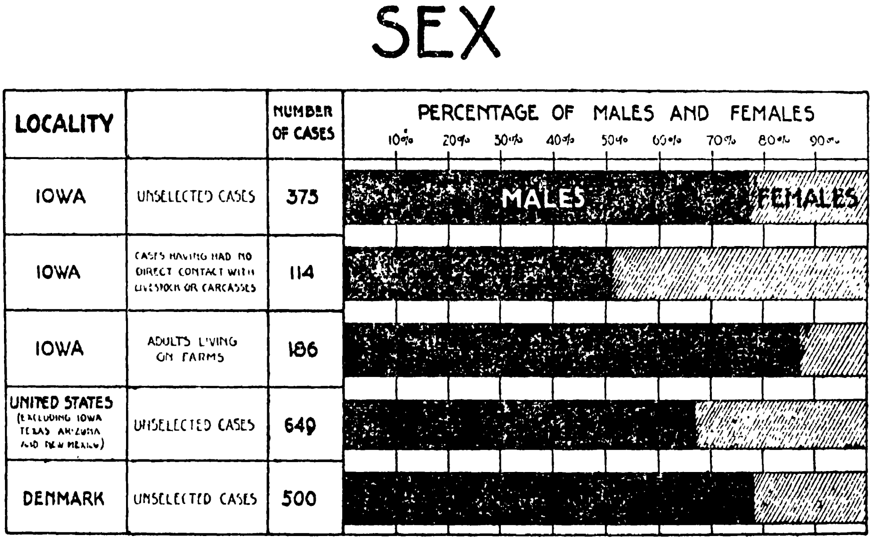

FIGURE 11.—Sex distribution of undulant fever in selected localities and groups

TABLE 5.—*Distribution by month of onset of the Iowa cases of 1928 and 1929 in which this information was available*

Month	Number of cases with onset in 1928	Number of cases with onset in 1929	Total, 1928 and 1929
January	7	8	15
February	6	12	18
March	9	20	29
April	7	13	20
May	9	18	27
June	12	20	32
July	13	19	32
August	14	20	34
September	17	15	32
October	11	5	16
November	12	13	25
December	5	10	15
Total	122	173	295

Seasonal distribution.—Undulant fever is a newly recognized disease in Iowa, and, therefore, few infections were discovered during the early period of this study. Medical interest in the disease was at first spasmodic, but became general following publicity (articles in medical journals and letters circularizing physicians), and then more cases were recognized. Cases occurring during 1928 and 1929 are arranged according to month of onset in Table 5. It will be seen that infections occur in every month of the year, the incidence

apparently reaching its maximum during the summer months. As these data cover but two years, no definite conclusions as to normal variation can be made.

Sources of infection.—In analyzing the data concerning sources of infection our cases fall into three well differentiated groups as follows: (*a*) Those without direct contact with livestock or carcasses; (*b*) rural residents with direct contact with livestock; (*c*) urban residents with direct contact with carcasses or livestock. The data associated with these individual groups will now be considered.

(*a*) *Those without exposure to livestock or carcasses.*—This group, as has already been indicated, is equally divided between males and females and includes persons of all ages. There are a few rural residents, but the majority live in small towns or cities. All occupational

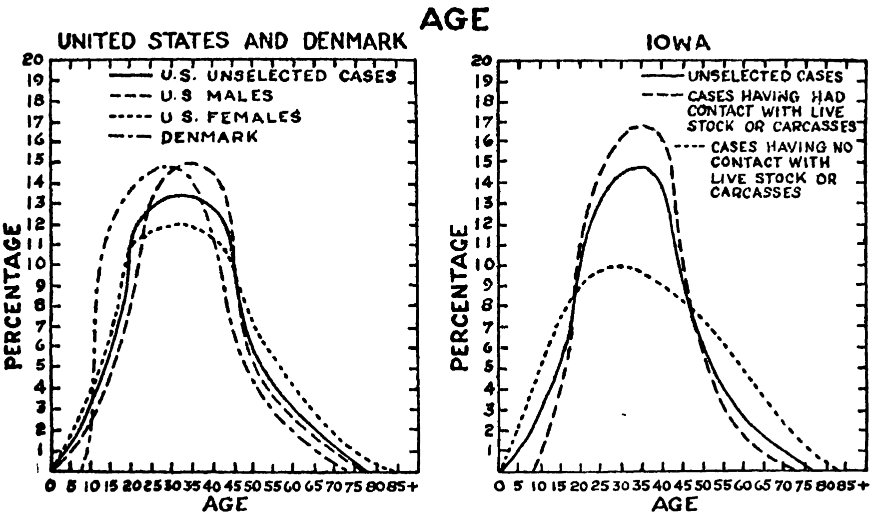

FIGURE 12.—Age distribution of undulant fever in selected localities and groups. These smooth curves were constructed from data available June 1, 1929

groups are included except farmers, stock buyers, packing-house employees, and butchers. The social and economic levels varied somewhat, the impression being that those who could better afford an abundance of raw dairy products were most likely to be attacked. There are 125 cases in this group, which is slightly more than one-third of those with sufficient data to allow grouping.

Inquiry was made concerning the diet, and the details regarding dairy products used as food recorded. With one exception, only American cheese had been ingested. The brands of cheese used were variable and the amounts small, hence this dairy product was of little importance. Nine persons used dairy butter which in six instances had been prepared by the patient. In all other cases creamery butter (prepared from pasteurized cream) had been purchased. Raw milk, or raw milk and cream, was used regularly by all but four; three supplemented the regular pasteurized supply with a raw supply; one

used pasteurized products consistently, except during a vacation period which just preceded the illness. In this group therefore, the cases seem clearly to be related to the ingestion of raw dairy products.

The data were further analyzed to determine, if possible, why these particular persons had become infected. Were the dairy herds very heavily infected, or did the persons ingest an unusually large amount of raw dairy products? Ninety-nine patronized 93 public dairies, while 15 obtained milk from cows owned by the family. In 11 instances the source of the milk was not recorded. The herds supplying 18 of the public dairies and 12 of the privately owned herds were tested serologically. Of these, 24 were found to have positive animals, 3 to have doubtful reactors only, and in 3 all specimens sent to the laboratory were found to be negative. In a few instances suspicious animals had been sold before they were tested. The proportion of positive animals was not high. Excluding the three herds in which no reactors were found, only 28 per cent of the total of 341 animals were found to be definitely positive. An additional 9 per cent gave doubtful reactions. Six different patients obtained milk supplied by six different cows, in each instance an infected animal.

The milk from three herds was examined bacteriologically and found to contain *Br. melitensis* var. *abortus*. In two other instances milk was supplied by herds of three animals only, and these six animals were infected. The remaining herds were large, and the proportion of known infected animals was not high.

The amount of milk used by these 125 patients was variable: 35 used three or more glasses daily, 32 used one or two glasses a day, while 24 did not drink milk but used it irregularly or in small quantities with coffee or with cereal. Two of the latter group used cream in the way mentioned, and nine others used dairy butter. Concerning the others our records are incomplete.

Thus, among those having no contact with livestock we found some who used milk freely; in four cases (two of whom were on Sippy diets) it was used in particularly large amounts. A few patients used milk from single infected cows; a few others, from herds known to be heavily infected. There were, however, only four patients who used dairy products very freely from herds known to be heavily infected or from one infected animal. There were, on the other hand, patients who used dairy products only sparingly, and from very lightly infected herds. We assume that these cases were acquired through the ingestion of raw dairy products, but the factors which determined the occurrence of the infection are not at all clear. Dosage does not seem to be of first importance. Individual immunity or susceptibility are doubtless vital factors. There may be in addition accidental conditions of which we are not now aware. Common predisposing causes have not been apparent.

(*b*) *Rural cases having direct contact with livestock.*—This group includes farmers, farmers' sons, farmers' wives, and one veterinarian—a total of 169. One hundred and sixty-two (96 per cent) were males and 7 (4 per cent), females. All but 2 had contact with cattle, and all but 8 (5 women and 3 men) had more or less direct contact with hogs. These patients belong to the active working class and varied in age from 15 to 55 years.

Among such patients who have had contact with two distinct reservoirs of infection—cattle and hogs—it has been difficult to determine accurately the source in individual cases; nevertheless we have felt that we could suggest it in many. Hence, we have outlined what information we have concerning use of dairy products as well as the histories and serological findings on the herds.

Pasteurized milk was not used by any person in this group. The amounts of raw milk and cream used differed in no significant way from that in group (*a*). Sixty-six drank 3 or more glasses of milk daily, or used cream freely, and 15 of these also used dairy butter; 26 drank 1 to 2 glasses of milk daily, and 4 of these also used dairy butter; 60 used milk or cream only in small amounts with coffee or cereal, and 20 of these also used dairy butter. Three patients used no milk, cream, or dairy butter. In the remaining 14 cases no information was obtained concerning the amounts of dairy products ingested.

The herds of cattle concerned gave evidence of infection as follows: 51 were serologically positive, 11 serologically suspicious, and 31 negative. The proportion of positive animals in these herds was essentially the same as in the total number. Twenty-three herds, not examined serologically, gave positive histories of contagious abortion, 4 suspicious histories, and 14 negative. Data concerning the other herds were not collected.

The evidence of infection in some of the herds of hogs, to which these cases were related, is given in Table 3. We have already pointed out the significance of positive or doubtful herd histories of hogs and have shown how misleading a negative herd history may be. Of the patients on which data are available, the evidence indicates, we feel, that more than one-half had contact with hogs with *Brucella* infection. It is probable that approximately one-half of this group were exposed to infection through contact with infected hogs; on the other hand, two-thirds of this group were exposed to diseased cows either through direct contact or the ingestion of raw dairy products.

In individual patients it was only rarely possible to determine whether the source of the infection was in cattle or in hogs. In some the evidence seemed conclusive, as, for example, in the 14 cases in which hogs were serologically positive and the cattle negative, or in the 12 instances in which the cattle were serologically positive and

the hogs negative. Even on the basis of herd histories alone the evidence was often strong, as in nine cases in which there had been abortion among the hogs, whereas the cattle had no history suggestive of infection. However, in other cases no conclusion as to source could be drawn, since some of the farmers had contact with herds of cattle and hogs, both of which were infected. On six farms (with 10 cases) serological findings conclusively showed this to be true; in 10 instances positive and suspicious serological findings occurred in the related herds, and in 14 others the histories of the herds of both cattle and hogs were positive or suspicious. Moreover, in the 24 instances in which cattle alone were considered and found to be serologically positive, the evidence as to the source can not be accepted as conclusive, since the hogs were not similarly tested. In the case of farmers, therefore, only through an adequate serological study of the livestock with which they have had contact can reliable evidence be gathered as to the source of infection. Even with such a study the epidemiological findings in some cases do not give a final answer.

Additional evidence concerning the source of infection in this group may be deduced from a consideration of the sex ratio. The preponderance of infected males in the farm population can only be adequately explained by their more frequent exposure through direct contact with livestock.

From patients in this group we have isolated 29 cultures, 24 *suis* variety and 5 *abortus* variety. This is in striking contrast to group (*a*), in which there were eight organisms isolated, all of the *abortus* or *bovine* type. One *suis* organism was isolated from a farmer's wife, who had had no contact with either cattle or hogs but whose illness was preceded by an infection in husband and son. (See Appendix A, case 10 A.) We can only account for this difference in the organisms isolated by assuming that the source of infection and the means of transmission were different in the two groups.

Weighing all evidence, the information indicates that in group (*b*) the sources were about equally divided between cattle and hogs. Most of the infections derived from cattle, though possibly not all, may be explained by ingestion; those derived from hogs were dependent, we believe, on direct or indirect contact, the portal of entry presumably being the skin.

(*c*) *Urban cases having direct contact with livestock or carcasses.*—This group includes the 37 packing-house employees, 2 butchers, and 1 worker in a rendering plant. All were males. The facts collected in regard to these cases are as follows: Dairy products were as a rule used sparingly; 21 obtained only pasteurized milk and cream; 3 used only "canned" milk, 4 used raw milk but only 1 drank as much as 1 pint daily, 3 others used small amounts but were unable to state

the source, and in 9 cases we have no details concerning dairy products except for the note that 1 used country-made butter.

All of our packing-plant cases worked in the hog division, with one possible exception—a recent uninvestigated case whose physician volunteered the information that his patient had been engaged in cleaning the intestines of cattle. Three others had contact with cattle as well as with hogs—one a buyer, one employed in the hide cellar and occasionally on the hog-killing floor, and the third, a weigher, exposed to both beef and pork. Twenty-nine were variously employed on the hog-killing and cutting floors ("shackling hogs," "ribbing," "shaving hams," "cleaning intestines," "breaking necks" with an air gun, handling condemned meats or heads, etc.). One did clerical work for the most part, but was occasionally on the killing and cutting floors. The details as to occupation were not recorded in the three other cases. The two butchers and the operator of the rendering plant handled carcasses of both cattle and hogs.

Probably equal amounts of beef and pork are handled in the packing plants of Iowa; yet of the 10 organisms isolated from the employees all were of the *suis* variety. This bacteriological finding seems to confirm our epidemiological impressions, which indicate that contact with fresh tissues of diseased hogs not infrequently results in infection, while similar contact with the carcasses of cattle is rarely followed by undulant fever.

Modes of transmission and factors related to infection.—In the three groups described above two modes of transmission of the infection are to be discerned: Some individuals apparently receive the disease agent from infected dairy products—raw milk, cream, or butter; others acquire infection manifestly through the handling of livestock or fresh meats. Ingestion and contact appear, then, to be the chief means of transmission. Bearing in mind the ubiquity of the organism concerned, one wonders why undulant fever does not occur with greater frequency. It is likely that dairy products which serve in disseminating the infection either carry large numbers of the organism or strains of unusual virulence. We believe also that it is not casual contact but that special forms of contact with infected animals, their tissues, or discharges, operate to determine infection. In both groups the factor of relative human immunity also must be operative.

The significance of hog contact of a special form is most apparent in the group of packing house workers, particularly those on the killing floor who are intimately exposed to fresh carcasses. Here meat axe and knife lay bare porcine organisms in infected tissues, affording direct access into the skin of the worker which so often is cut or abraded, a condition common to this occupation.

Farmers also lay themselves open to infection through contacts of a special character. These contacts with hogs occur in such procedures

as vaccinating, ringing, castrating, and medicating, when struggling animals must be securely held; and in loading hogs for market, in handling newborn pigs, especially the weaker ones, during the first hours of life. A special type of contact with cattle occurs in the

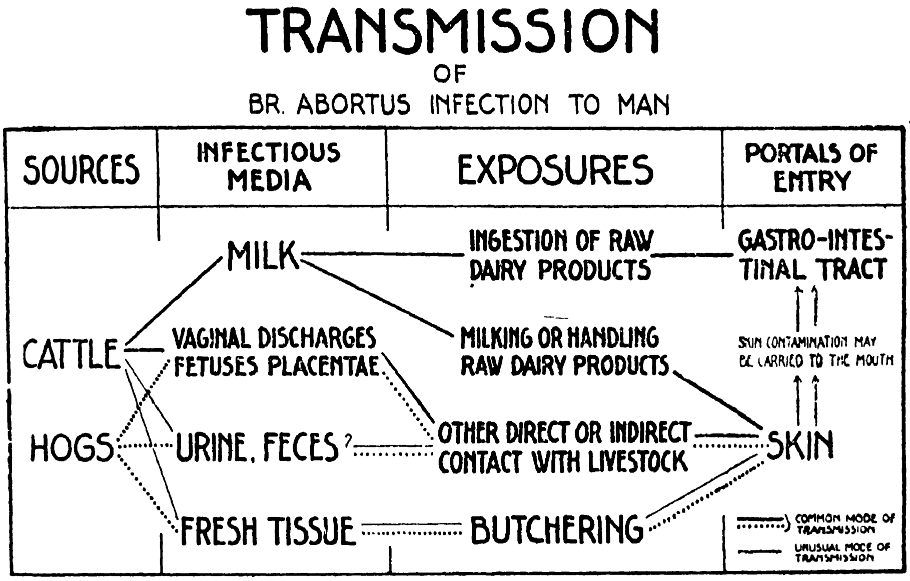

FIGURE 13.—Modes of transmission of *Br. melitensis* var. *abortus* and *suis* infections to man

manual removal of placentæ. Such contact preceded the onset of illness in a few farmer patients in our series.

Our conception of the common sources and modes of transmission is shown in Figure 13. It was suggested to us in our epidemiological work that the skin served as a portal of entry. This prompted the

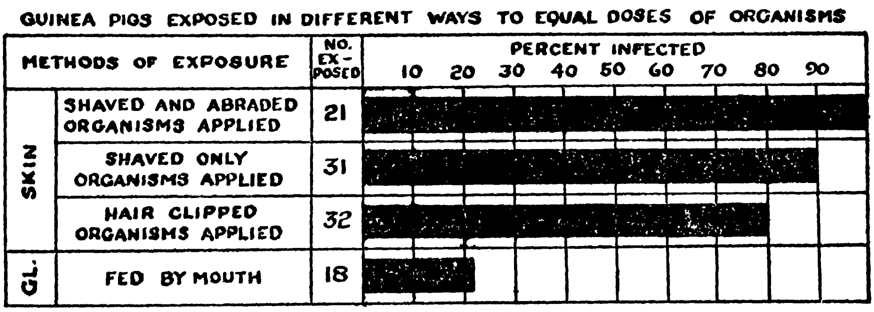

FIGURE 14.—Results of experimental study of portals of entry in *Brucella* infection

experiments on guinea pigs previously reported (72). The results of these experiments are shown in Figure 14. Taking everything into consideration, we are led to the opinion that, in no small proportion of our cases, infection resulted from direct contact, the organisms gaining entrance directly through the skin.

EPIDEMIOLOGICAL FINDINGS IN STATES OTHER THAN IOWA

The increasing recognition of undulant fever, as well as the distribution of recognized cases, is clearly illustrated by the maps in Figures 15 to 20. The data here presented have been collected in part from the numerous reports in the literature, but mainly by correspondence with the directors of various State laboratories, chiefs of divisions of communicable diseases, secretaries of State departments of health, and other investigators. The figures for 1929 have been kindly supplied by Doctor Simpson, of Dayton, Ohio. Many cases have been found in areas in which an active interest has been displayed in obtaining an accurate recognition of the disease.

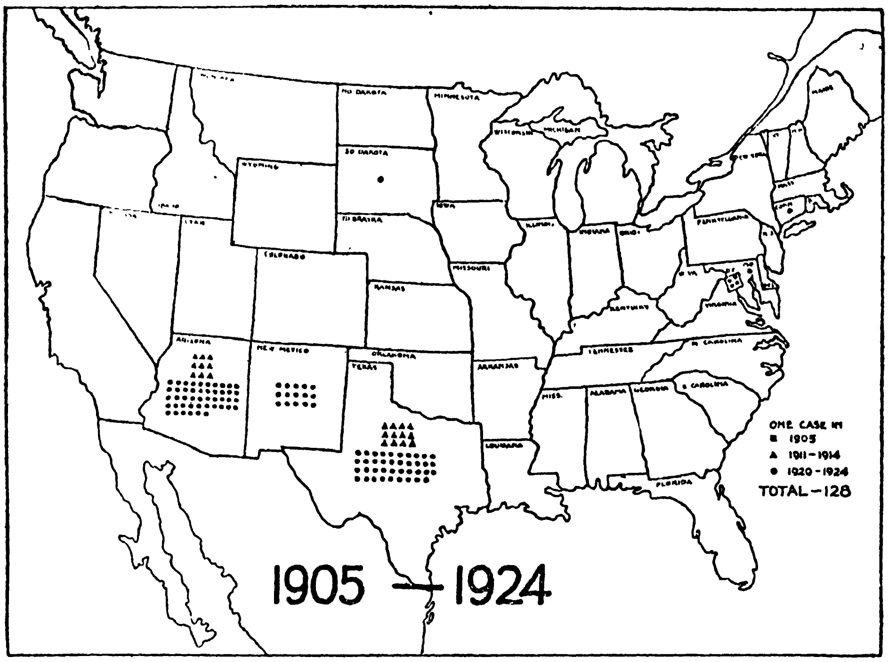

FIGURE 15.—Distribution of reported cases of undulant fever in the United States, 1905–1924

At the present time neither the true incidence nor distribution of the infection in this country can be stated. We suspect, however, that in those regions in which *Br. melitensis* var. *suis* is distributed the disease will prove to be a more serious health hazard than elsewhere.

The age distribution of cases reported up to June, 1929, is represented by curves in Figure 12. Two things are worthy of note: (1) The curve representing "males" is strikingly similar to that representing "those having direct contact with livestock or carcasses;" (2) the curve representing "females" somewhat simulates that representing "those who have no direct contact with livestock or carcasses," a group composed equally of males and females. The age distribution seems dependent on two factors, a variation in susceptibility and a variation in direct exposure to infected animals.

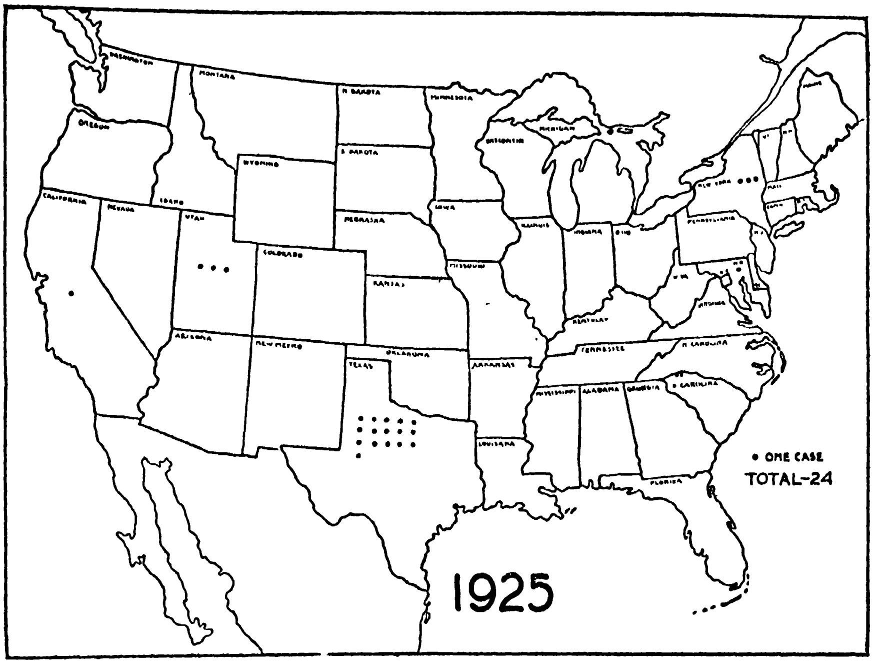

FIGURE 16.—Distribution of reported cases of undulant fever in the United States in 1925

Of 649 cases in States other than Iowa, 67 per cent were males (fig. 11). Simpson has reported no preponderance of males in Ohio, while in other localities the proportion has been similar to that in Iowa.

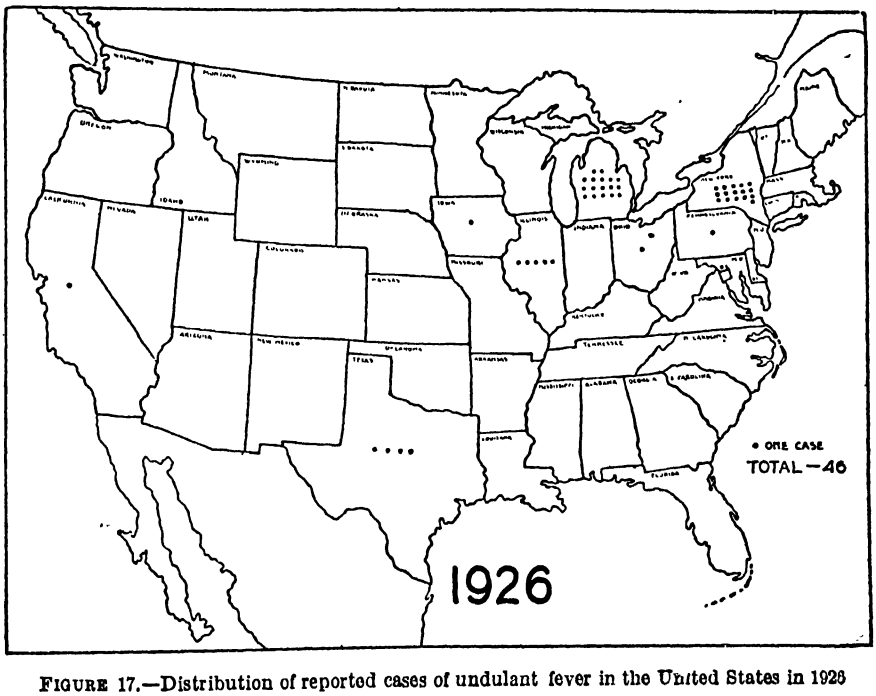

FIGURE 17.—Distribution of reported cases of undulant fever in the United States in 1926

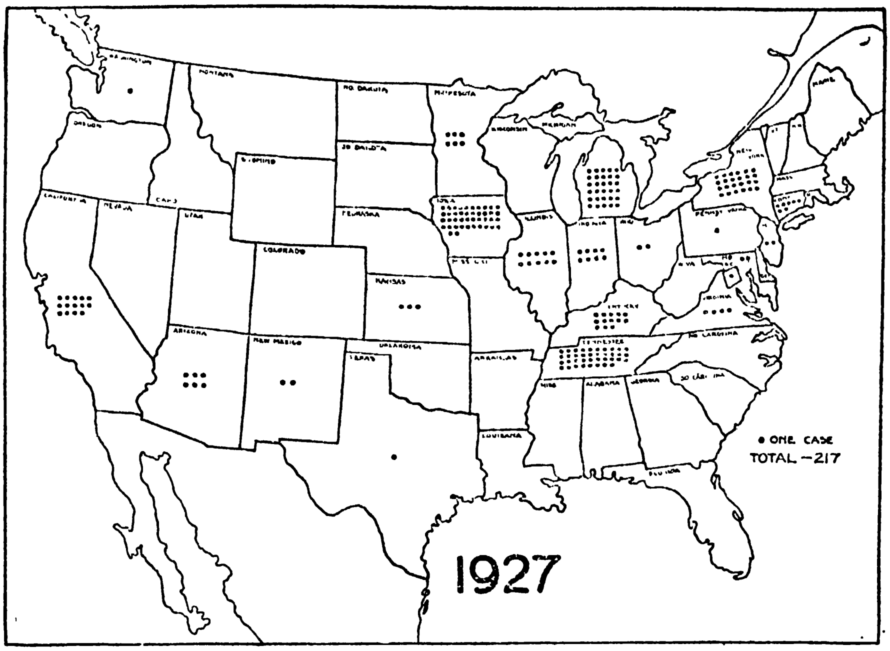

FIGURE 18.—Distribution of reported cases of undulant fever in the United States in 1927

In different States the occupational distribution of cases seems to vary greatly. Such data are, however, of significance only when they are related to the proportion of the population engaged in the several occupations.

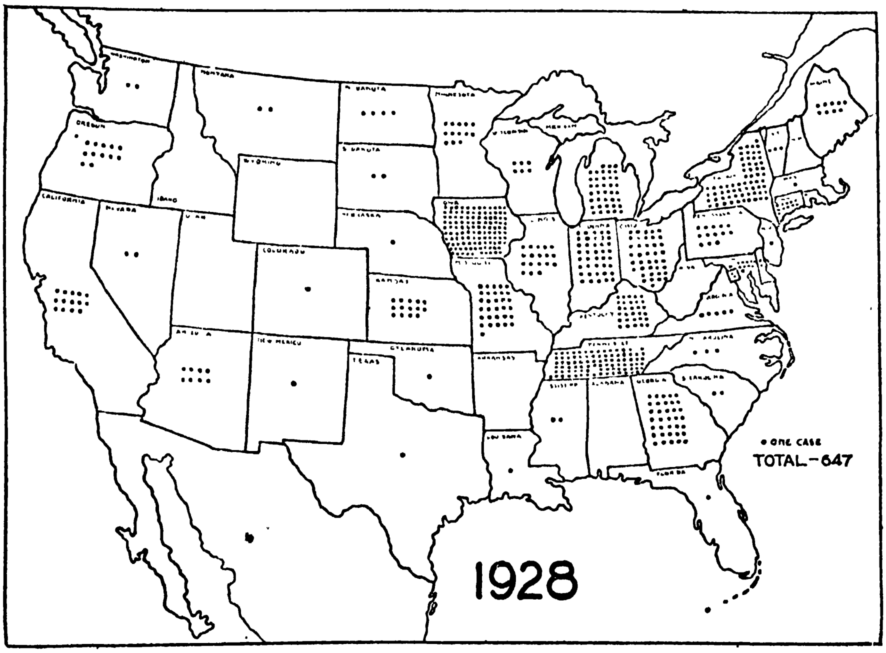

FIGURE 19.—Distribution of reported cases of undulant fever in the United States in 1928

In a number of States the common reservoir of infection has supposedly been cattle and the common mode of transmission through raw dairy products. There are, however, occasional references to cases definitely attributed to hog contact either on the farm or in packing plants.

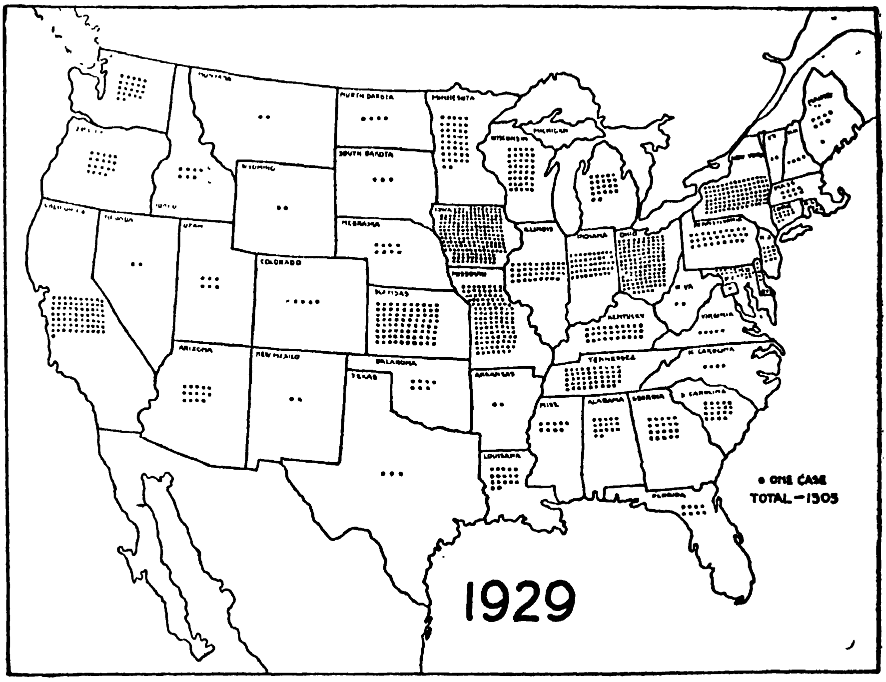

FIGURE 20.—Distribution of reported cases of undulant fever in the United States in 1929

EPIDEMIOLOGICAL FINDINGS IN OTHER COUNTRIES

Bevan (25) of Rhodesia, in 1921, first called attention to cases of undulant fever probably related to cattle infected with contagious abortion. Four years later he reported 35 cases, and of the 31 adults included 26 (84 per cent) were males. There have recently been numerous articles bearing on this infection in other countries, with a few case reports. Little data can be deduced from these scattered cases. Kristensen (60), however, has carried out a careful study of the infection in Denmark and reported on 500 cases as follows: (1) The 34 strains of *Brucella* isolated corresponded to *Br. melitensis* var. *abortus* in pathogenicity, carbon dioxide requirement, and reaction to dyes, but were very different from the American porcine type. (2) There was no characteristic seasonal distribution of the infection. (3) The cases occurred sporadically. (4) Males were attacked in greater numbers than females (78 per cent males). (5) Most cases were in the age group of 15 to 40. Young children were not involved. (6) The infection occurred chiefly in rural districts.

(7) Contact with infected animals (cattle) must have played an important rôle in the transmission of the infection. (8) Hogs did not appear to be the source of any of these infections.

SUMMARY OF EPIDEMIOLOGICAL DATA, AND COMMENT

Undulant fever due to infection with the *abortus* or *suis* varieties of *Br. melitensis* is widespread and in regions in which systematic investigations have been conducted the disease has been found to be of not infrequent occurrence. It has involved chiefly young and middle aged adults, and males have predominated in all but very few studies. Men on the farms and packing-house employees have been particularly involved. Cattle have been generally regarded as the source of human infection, but in some localities hogs have played an important part. That direct contact with animals often accounts for human infection is being more generally recognized. We have brought forth evidence to indicate that the skin may be an important portal of entry. Otero, of Porto Rico, in a personal communication writes as follows concerning his experiments on human volunteers:

"It may be of interest to know that some of our inoculations through abraded skin have been successful, giving rise to clear-cut cases of undulant fever after a single inoculation, in some cases with strains that were fed repeatedly with apparently no symptoms. I have six such cases at present running fever."

We feel that the data presented make untenable the opinion that the ingestion of raw dairy products from infected cows is the only means of transmission of undulant fever. It is apparent, in Iowa, at least, that approximately one-half of the cases result from a second means of transmission, namely, through contact with infected animals, their tissues, or discharges; the infection in all probability entering through the skin.

(The concluding chapters of this report presenting the clinical data, preventive measures, case records, and bibliography, will be published in the following issue of PUBLIC HEALTH REPORTS.)

DEATHS DURING WEEK ENDED SEPTEMBER 20, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended September 20, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Sept. 20, 1930	Corresponding week, 1929
Policies in force	75, 532, 011	74, 688, 919
Number of death claims	13, 466	12, 802
Death claims per 1,000 policies in force, annual rate	9. 3	8. 9

Deaths[1] from all causes in certain large cities of the United States during the week ended September 20, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Sept. 20, 1930				Corresponding week, 1929		Death rate[2] for first 38 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1930	1929
Total (78 cities)	6,876	10.4	718	[4] 57	10.0	735	12.1	12.9
Akron	35	7.2	3	28	7.0	11	7.9	9.5
Albany[5]	28	11.4	2	41	14.0	0	15.0	16.5
Atlanta	79	15.4	10	102	12.7	12	16.1	16.2
White	45	-----	6	95	-----	10	-----	-----
Colored	34	(6)	4	115	(6)	2	(6)	(6)
Baltimore[5]	224	14.5	17	59	11.1	29	14.2	14.9
White	166	-----	11	49	-----	22	-----	-----
Colored	58	(6)	6	96	(6)	7	(6)	(6)
Birmingham	56	11.3	7	67	11.6	9	14.0	16.5
White	19	-----	3	48	-----	5	-----	-----
Colored	37	(6)	4	98	(6)	4	(6)	(6)
Boston	198	13.2	25	73	9.2	13	14.2	15.4
Bridgeport	22	7.8	0	0	7.8	5	11.2	12.4
Buffalo	125	11.4	19	85	9.4	10	13.2	14.2
Cambridge	24	11.0	3	60	6.9	3	11.8	12.7
Camden	24	10.7	3	53	12.0	2	13.9	14.7
Canton	13	6.4	4	107	10.0	3	10.1	11.5
Chicago[5]	641	9.9	52	46	8.9	46	10.5	11.5
Cincinnati	114	13.2	8	47	12.2	12	15.7	17.3
Cleveland	173	10.0	19	57	8.7	10	11.3	12.8
Columbus	75	13.5	5	49	13.8	5	15.9	15.2
Dallas	40	7.9	7	-----	8.2	5	11.7	11.8
White	37	-----	6	-----	-----	5	-----	-----
Colored	3	(6)	1	-----	(6)	0	(6)	(6)
Dayton	48	12.4	10	149	10.6	5	10.6	11.6
Denver	67	12.1	12	131	14.4	7	14.9	15.1
Des Moines	19	6.9	3	55	8.5	2	11.9	11.8
Detroit	258	8.5	44	68	9.0	45	9.5	11.4
Duluth	20	10.3	1	27	14.4	4	11.2	11.7
El Paso	20	10.2	7	-----	19.2	6	17.8	20.3
Erie	28	12.6	2	44	11.8	2	11.4	12.7
Fall River[5 7]	25	11.4	0	0	9.1	0	12.2	14.2
Flint	23	7.6	5	59	16.8	17	9.3	10.9
Fort Worth	36	11.6	6	-----	8.9	2	11.3	12.8
White	25	-----	4	-----	-----	2	-----	-----
Colored	11	(6)	2	-----	(6)	0	(6)	(6)
Grand Rapids	34	10.5	3	45	7.2	5	10.4	10.2
Houston	71	12.7	10	-----	8.9	5	12.4	12.9
White	44	-----	2	-----	-----	3	-----	-----
Colored	27	(6)	8	-----	(6)	2	(6)	(6)
Indianapolis	88	12.6	10	75	13.4	17	14.8	15.0
White	76	-----	10	86	-----	13	-----	-----
Colored	12	(6)	0	0	(6)	4	(6)	(6)
Jersey City	70	11.5	7	61	8.1	10	11.5	12.7
Kansas City, Kans.	26	11.1	4	93	9.4	0	11.5	13.5
White	20	-----	4	110	-----	0	-----	-----
Colored	6	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo.	79	10.4	6	50	11.6	5	13.6	14.2
Knoxville	23	11.3	4	94	13.1	4	14.0	14.0
White	19	-----	3	78	-----	4	-----	-----
Colored	4	(6)	1	243	(6)	0	(6)	(6)
Los Angeles	253	10.6	24	73	9.7	17	11.2	11.5
Louisville	52	8.8	12	103	12.0	3	13.7	15.2
White	41	-----	8	79	-----	3	-----	-----
Colored	11	(6)	4	265	(6)	0	(6)	(6)
Lowell[7]	15	7.8	2	53	9.8	6	13.6	14.5
Lynn	18	9.2	3	84	7.7	2	10.6	11.5
Memphis	53	10.9	5	59	18.4	12	17.6	19.5
White	24	-----	1	18	-----	6	-----	-----
Colored	29	(6)	4	135	(6)	6	(6)	(6)
Milwaukee	99	9.0	14	61	10.4	16	9.9	11.2
Minneapolis	100	11.2	10	66	7.9	4	10.8	11.0

See footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended September 20, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*—Continued.

City	Week ended Sept. 20, 1930				Corresponding week, 1929		Death rate [2] for first 38 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Nashville	27	9.6	6	94	14.6	4	17.4	19.2
White	21		5	105		4		
Colored	6	([6])	1	62	([6])	0	([6])	([6])
New Bedford [7]	13	6.0	2	51	7.8	2	10.9	12.6
New Haven	38	12.2	2	31	9.0	1	13.1	13.4
New Orleans	120	13.7	10	56	13.9	11	17.7	17.8
White	62		4	34		4		
Colored	58	([6])	6	97	([6])	7	([6])	([6])
New York	1,171	8.7	119	50	8.7	137	10.9	11.5
Bronx Borough	156	6.4	10	29	5.7	13	8.0	8.4
Brooklyn Borough	421	8.4	53	56	7.7	57	9.9	10.4
Manhattan Borough	450	12.7	42	54	13.1	58	16.4	16.8
Queens Borough	116	5.5	13	52	5.3	5	7.1	7.8
Richmond Borough	28	9.2	1	19	15.5	4	14.6	16.2
Newark, N. J	88	10.3	6	31	10.9	8	12.1	13.1
Oakland	50	9.1	5	62	10.8	6	11.0	11.6
Oaklahoma City	39	11.0	7	126	7.7	6	10.9	10.8
Omaha	56	13.6	2	24	9.8	8	13.7	13.9
Paterson	28	10.6	3	52	10.2	4	12.4	13.6
Philadelphia	456	12.1	48	71	10.3	35	12.7	13.4
Pittsburgh	158	12.3	25	89	11.0	14	13.9	15.0
Portland, Oreg	55	9.6	1	12	10.9	4	12.4	12.9
Providence	54	11.2	10	93	10.2	6	13.3	14.8
Richmond	47	13.4	5	73	10.9	4	15.1	16.5
White	29		2	44		3		
Colored	18	([6])	3	128	([6])	1	([6])	([6])
Rochester	64	10.2	4	36	6.9	6	11.7	12.6
St. Louis	135	8.6	13	45	11.1	20	14.4	14.9
St. Paul	42	8.1	1	10	9.3	2	10.2	10.6
Salt Lake City [5]	28	10.4	5	79	13.9	2	12.5	13.2
San Antonio	59	12.0	7		8.4	6	15.5	14.8
San Diego	35	12.2	1	21	16.4	4	14.5	15.4
San Francisco	146	12.1	7	47	10.2	6	13.3	13.3
Schenectady	24	13.1	0	0	9.8	2	11.4	12.6
Seattle	52	7.4	2	20	9.4	4	11.0	11.1
Somerville	17	8.5	0	0	8.1	0	9.9	9.4
Spokane	22	9.9	0	0	10.0	2	12.4	13.0
Springfield, Mass	31	10.8	2	34	12.3	4	12.2	13.0
Syracuse	37	9.3	4	49	10.7	3	11.8	13.5
Tacoma	17	8.3	1	27	8.8	0	12.6	11.8
Toledo	69	12.3	11	101	12.3	7	12.7	13.8
Trenton	32	13.6	1	19	15.8	5	16.9	17.4
Utica	22	11.2	1	28	12.8	1	14.9	15.7
Washington, D. C	112	12.0	8	47	13.2	20	15.3	15.6
White	71		6	52		10		
Colored	41	([6])	2	36	([6])	10	([6])	([6])
Waterbury	10	5.2	2	49	5.2	1	9.8	9.6
Wilmington, Del.[7]	28	13.9	3	72	12.4	6	14.7	14.2
Worcester	42	11.1	2	28	11.8	7	12.9	12.9
Yonkers	17	6.5	2	48	6.3	2	8.1	9.4
Youngstown	39	11.9	2	29	5.4	4	10.3	12.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population April 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended September 27, 1930, and September 28, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 27, 1930, and September 28, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 27, 1930	Week ended Sept. 28, 1929	Week ended Sept. 27, 1930	Week ended Sept. 28, 1929	Week ended Sept. 27, 1930	Week ended Sept. 28, 1929	Week ended Sept. 27, 1930	Week ended Sept. 28, 1929
New England States:								
Maine	1	4	1			2	0	0
New Hampshire	2					9	0	0
Vermont	1	3			1		0	0
Massachusetts	50	66		2	50	32	3	2
Rhode Island	6	8					0	0
Connecticut	7	10	3	1	4	6	1	0
Middle Atlantic States:								
New York	54	100	[1] 2	[1] 5	45	83	7	17
New Jersey	46	72	2	2	16	7	1	8
Pennsylvania	125	123			51	68	6	14
East North Central States:								
Ohio	63	57	11	11	21	28	9	4
Indiana	8	30	5		2	5	3	0
Illinois	102	130	3	14	20	73	5	9
Michigan	44	62			18	85	3	14
Wisconsin	11	13	31	66	21	43	1	1
West North Central States:								
Minnesota	13	30		1	1		0	2
Iowa	5	8		1	2	17	0	0
Missouri	27	36		3	13	14	4	4
North Dakota	1	6			8	3	3	1
South Dakota	8	1			9	1	1	0
Nebraska	5	29			1	8	0	2
Kansas	7	30		1	4	23	1	3
South Atlantic States:								
Delaware		1	1				0	0
Maryland [2]	14	12	4	2	4	5	0	2
District of Columbia	15	8		2	3	1	0	0
Virginia								
West Virginia	21	7	1	12	13	30	0	2
North Carolina	118	214	14		10	2	3	3
South Carolina	38	61	160	250			0	0
Georgia	21	27	15	31	5	8	0	1
Florida	5	32	1		4	3	0	0

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 27, 1930, and September 28, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 27, 1930	Week ended Sept. 28, 1929	Week ended Sept. 27, 1930	Week ended Sept. 28, 1929	Week ended Sept. 27, 1930	Week ended Sept. 28, 1929	Week ended Sept. 27, 1930	Week ended Sept. 28, 1929
East South Central States:								
Kentucky		15				19	1	0
Tennessee	18	48	5	20	12	1	0	0
Alabama	30	18	5	7	16		2	3
Mississippi	23	46					0	1
West South Central States:								
Arkansas	7	9	2	3		4	0	1
Louisiana	43	26		13	3		0	0
Oklahoma [3]	33	57	2	14	2	7	1	1
Texas	15	33	2	21		1	0	0
Mountain States:								
Montana					2	112	0	3
Idaho	2						0	1
Wyoming	1			1		4	0	1
Colorado	10	9			7	6	2	0
New Mexico	3	6					0	0
Arizona	6	5					1	2
Utah [2]		2		5	2	1	2	0
Pacific States:								
Washington	3	17		1	4	5	2	2
Oregon	5	4	17	6	16	6	0	0
California	39	39	39	21	56	23	4	7

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 27-1930	Week ended Sept. 28, 1929	Week ended Sept. 27-1930	Week ended Sept. 28, 1929	Week ended Sept. 27, 1930	Week ended Sept. 28, 1929	Week ended Sept. 27-1930	Week ended Sept. 28, 1929
New England States:								
Maine	21	0	12	20	0	0	9	6
New Hampshire	1	0	2	16	0	0	9	0
Vermont	0	1	3	2	0	0	1	1
Massachusetts	32	3	72	81	0	0	11	8
Rhode Island	2	0	3	2	0	0	1	2
Connecticut	5	0	14	23	0	0	2	5
Middle Atlantic States:								
New York	65	42	71	70	8	0	54	31
New Jersey	6	3	47	32	0	0	21	11
Pennsylvania	10	7	138	95	0	0	88	30
East North Central States:								
Ohio	100	9	184	192	19	18	75	34
Indiana	6	2	48	54	12	15	12	9
Illinois	43	3	142	180	12	22	43	33
Michigan	13	8	101	93	1	16	24	20
Wisconsin	20	0	41	44	6	7	5	4
West North Central States:								
Minnesota	17	0	32	52	4	6	7	7
Iowa	21	6	18	33	7	11	2	6
Missouri	18	1	36	29	8	8	30	14
North Dakota	2	0	11	9	1	4	4	1
South Dakota	4	0	4	6	1	8	1	5
Nebraska	26	0	12	15	10	3	7	1
Kansas	48	2	35	9	1	6	11	9
South Atlantic States:								
Delaware	0	0	4	1	0	0	3	1
Maryland [2]	2	1	11	21	0	0	51	25
District of Columbia	0	0	3	4	0	0	2	0
Virginia		17						
West Virginia	3	6	19	17	7	4	53	24
North Carolina	5	5	96	102	1	5	40	22
South Carolina	2	1	21	26	0	0	35	35
Georgia	1	2	16	41	0	0	35	11
Florida	2	1	4	2	0	0	6	0

[2] Week ended Friday. [3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 27, 1930, and September 28, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 27, 1930	Week ended Sept. 28, 1929	Week ended Sept. 27, 1930	Week ended Sept. 28, 1929	Week ended Sept. 27, 1930	Week ended Sept. 28, 1929	Week ended Sept. 27, 1930	Week ended Sept. 28, 1929
East South Central States:								
Kentucky	1	0	16	27	0	0	54	36
Tennessee	2	12	30	52	2	0	42	48
Alabama	1	2	45	51	0	0	21	17
Mississippi	2	0	12	19	0	0	35	17
West South Central States:								
Arkansas	1	0	4	8	0	0	15	18
Louisiana	11	0	8	14	1	1	27	24
Oklahoma [3]	8	0	23	50	13	7	52	31
Texas	8	0	11	17	4	7	7	96
Mountain States:								
Montana	0	0	15	18	0	11	15	56
Idaho	1	1	1	6	0	1	0	0
Wyoming	7	0	7	5	0	2	0	3
Colorado	4	1	9	10	0	1	11	8
New Mexico	2	0	8	3	0	1	20	12
Arizona	1	0	5	2	0	5	6	2
Utah [2]	2	0	3	15	0	0	2	0
Pacific States:								
Washington	3	0	31	24	12	12	5	10
Oregon	1	1	13	5	2	4	4	5
California	65	6	59	99	7	27	11	5

[2] Week ended Friday. [3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July, 1930										
Hawaii Territory	3	22	11		18		2		0	16
August, 1930										
Alabama	15	51	20	722	85	66	6	80	2	186
California	15	147	37	32	305	6	229	136	46	79
Kansas	11	40	2	3	45		182	71	27	65
Michigan	28	121	1	18	194	1	16	170	57	70
Mississippi	6	61	371	6,745	96	970	7	26	9	161
Missouri	22	78	6	53	66	1	51	78	54	148
Nevada									0	
Oklahoma [1]	7	25	15	421	47	48	47	29	43	248
Oregon	3	19	25	13	82		4	24	20	28
Rhode Island	1	11			8		5	13	0	5
South Carolina	148	86	337	2,869	13	773	4	26	2	280
South Dakota	3	30			7		24	10	29	19
Virginia	4	98	275	83	208	68	22	135	4	312
Washington	5	29	9		81		11	44	42	21

[1] Exclusive of Oklahoma City and Tulsa.

July, 1930

Hawaii Territory:	Cases
Chicken pox	8
Conjunctivitis, follicular	11
Hookworm disease	18
Leprosy	2
Mumps	19
Tetanus	1
Whooping cough	9

August, 1930

Anthrax:	Cases
California	7
Chicken pox:	
Alabama	6
California	130
Kansas	15
Michigan	79
Mississippi	142

Chicken pox—Continued.	Cases
Missouri	25
Nevada	4
Oklahoma [1]	2
Oregon	24
Rhode Island	5
South Carolina	46
South Dakota	7
Virginia	90
Washington	43
Dengue:	
Alabama	6
Mississippi	2
South Carolina	3
Diarrhea:	
South Carolina	926
Diarrhea and dysentery:	
Virginia	1,186
Dysentery:	
California (amebic)	6
California (bacillary)	10
Mississippi (amebic)	93
Mississippi (bacillary)	1,024
Oklahoma [1]	41
Oregon	3
South Carolina	1
Food poisoning:	
California	68
German measles:	
California	22
Kansas	3
Rhode Island	3
Washington	7
Granuloma, coccidioidal:	
California	1
Hookworm disease:	
Mississippi	340
Oklahoma [1]	1
South Carolina	151
Impetigo contagiosa:	
Kansas	4
Oregon	8
Jaundice:	
California	1
Leprosy:	
California	1
Michigan	1
Lethargic encephalitis:	
Alabama	2
California	4
Michigan	1
Oregon	1
South Carolina	5
Washington	1
Mumps:	
Alabama	24
California	333
Kansas	25
Michigan	72
Mississippi	156
Missouri	29
Oklahoma [1]	1
Oregon	55
South Carolina	22
Washington	75

[1] Exclusive of Oklahoma City and Tulsa.

Ophthalmia neonatorum:	Cases
California	2
Mississippi	23
Missouri	2
Oklahoma [1]	1
Rhode Island	2
South Carolina	10
South Dakota	1
Paratyphoid fever:	
California	6
Kansas	8
Oregon	1
Rhode Island	1
South Carolina	25
Puerperal septicemia:	
Mississippi	29
Washington	3
Rabies in animals:	
California	44
Mississippi	8
Missouri	5
Rhode Island	5
South Carolina	4
Rabies in man:	
Michigan	1
Rocky Mountain spotted or tick fever:	
Oregon	3
Scabies:	
Kansas	2
Oregon	1
Septic sore throat:	
Kansas	1
Michigan	3
Missouri	12
Oklahoma [1]	18
Oregon	2
Rhode Island	2
Tetanus:	
California	5
Kansas	2
South Dakota	1
Washington	1
Trachoma:	
California	8
Missouri	43
Oklahoma [1]	6
South Dakota	1
Trichinosis:	
California	4
Tularaemia:	
Alabama	1
California	3
Missouri	1
Oregon	1
Typhus fever:	
Alabama	11
South Carolina	5
Virginia	11
Undulant fever:	
Alabama	1
California	8
Kansas	7
Missouri	31
South Carolina	1
South Dakota	3
Virginia	2
Washington	2

	Cases
Vincent's angina:	
Kansas	2
Oregon	5
Rhode Island	1
Whooping cough:	
Alabama	143
California	377
Kansas	112
Michigan	706
Mississippi	379
Whooping cough—Continued.	
Missouri	79
Nevada	4
Oklahoma [1]	32
Oregon	136
Rhode Island	37
South Carolina	233
South Dakota	9
Virginia	285
Washington	188

[1] Exclusive of Oklahoma City and Tulsa.

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of August, 1930, by departments of health of certain States to other State health departments

Disease	Alabama	Illinois	Kansas	Minnesota	Missouri	New Jersey	New York	Oregon	South Dakota	Washington
Chicken pox		1								
Diphtheria		2				1	2			
Encephalitis				1						
Gonorrhea				2						
Poliomyelitis		1			4		3			
Scarlet fever							2			
Smallpox		3								
Syphilis			17	1						
Tuberculosis	2	5		75				2		1
Typhoid fever		4		1			2		1	
Undulant fever				1						
Whooping cough		1								

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,140,000. The estimated population of the 90 cities reporting deaths is more than 30,550,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended September 20, 1930, and September 21, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	804	1,283	
97 cities	292	453	602
Measles:			
45 States	463	433	
97 cities	101	90	
Meningococcus meningitis:			
46 States	67	91	
97 cities	28	50	
Poliomyelitis:			
46 States	503	127	
Scarlet fever:			
46 States	1,050	1,349	
97 cities	383	412	413
Smallpox:			
46 States	128	190	
97 cities	28	32	9
Typhoid fever:			
46 States	940	752	
97 cities	137	135	162
Deaths reported			
Influenza and pneumonia:			
90 cities	358	323	
Smallpox:			
90 cities	0	0	

City reports for week ended September 20, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	3	0	1	----------	0	0	1	1
New Hampshire:								
Concord	----------	0	----------	----------	----------	----------	----------	----------
Vermont:								
Barre	0	0	0	----------	0	0	0	0
Burlington	0	0	0	----------	0	0	0	0
Massachusetts:								
Boston	12	19	8	----------	0	7	4	16
Fall River	0	2	2	----------	0	0	0	1
Springfield	0	2	1	----------	0	0	1	1
Worcester	1	3	1	----------	0	0	1	0
Rhode Island:								
Pawtucket	0	0	0	----------	0	0	0	1
Providence	1	4	1	----------	0	0	0	1
Connecticut:								
Bridgeport	0	4	0	----------	0	0	0	0
Hartford	1	2	0	----------	0	1	0	2
New Haven	0	2	0	----------	1	0	2	0
MIDDLE ATLANTIC								
New York:								
Buffalo	2	10	5	----------	0	1	2	7
New York	9	90	32	5	3	23	15	73
Rochester	1	2	4	----------	0	1	1	2
Syracuse	7	2	1	----------	0	1	1	4
New Jersey:								
Camden	1	3	1	----------	0	0	0	0
Newark	4	9	10	----------	0	1	0	6
Trenton	0	2	0	----------	0	0	0	2
Pennsylvania:								
Philadelphia	9	36	11	3	2	6	9	31
Pittsburgh	4	14	15	----------	0	1	1	18
Reading	2	1	0	----------	0	2	2	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	10	7	2	----------	0	0	19	1
Cleveland	18	29	3	4	1	3	4	8
Columbus	2	3	5	1	0	1	1	2
Toledo	1	6	1	----------	0	0	0	2
Indiana:								
Fort Wayne	0	2	0	----------	1	0	0	1
Indianapolis	5	7	3	----------	0	0	0	7
South Bend	4	1	0	----------	0	0	0	3
Terre Haute	0	0	0	----------	0	0	0	0
Illinois:								
Chicago	6	57	66	6	1	4	14	24
Springfield	0	1	0	1	0	2	0	1
Michigan:								
Detroit	5	38	35	----------	1	6	4	13
Flint	2	2	3	----------	0	0	0	1
Grand Rapids	0	1	0	----------	0	0	0	1

City reports for week ended September 20, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST NORTH CENTRAL—con.								
Wisconsin:								
Kenosha	1	1	1		0	0	0	2
Madison	4	1	0			1	3	
Milwaukee	0	8	1		0	6	6	4
Racine	0	1	1		0	0	0	0
Superior	0	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0		0	0	0	0
Minneapolis	8	20	7		0	1	7	5
St. Paul	1	10	2		0	0	1	4
Iowa:								
Davenport	0	1	0			0	0	
Des Moines	0	2	1			0	0	
Sioux City	0	1	1			0	2	
Waterloo	0	1	0			0	0	
Missouri:								
Kansas City	0	4	1		0	2	1	5
St. Joseph	0	1	1		0	0	1	0
St. Louis	0	23	8			7	3	
North Dakota:								
Fargo	0	0	0		0	0	9	3
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	0	0	0			0	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	1	8	5		0	0	1	4
Kansas:								
Topeka	0	1	0		0	0	0	1
Wichita	0	2	0		0	0	0	3
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	0	0		0	0	0	2
Maryland:								
Baltimore	0	17	3		0	2	4	10
Cumberland	0	0	0		0	0	0	0
Frederick	0	0	0		0	0	0	0
District of Columbia:								
Washington	0	9	3		0	7	0	4
Virginia:								
Lynchburg	0	2	2		0	0	1	0
Norfolk	0	2	2		0	0	1	6
Richmond	0	15	3		0	0	0	0
Roanoke	0	4	4		0	0	0	0
West Virginia:								
Charleston	0	1	0		0	0	1	1
Wheeling	0	1	0		0	1	0	0
North Carolina:								
Raleigh	0	4	1		0	0	0	1
Wilmington	0	0	3		0	0	0	3
Winston-Salem	0	3	0		0	0	0	1
South Carolina:								
Charleston	0	0	0	10	0	0	0	1
Columbia	0	1	0		0	0	1	1
Georgia:								
Atlanta	0	7	3	2	0	0	0	3
Brunswick	0	0	0		0	0	0	0
Savannah	0	1	1	2	0	1	0	0
Florida:								
Miami	0	2	1		0	0	0	1
St. Petersburg		0			0			0
Tampa	0	1	0	1	0	0	0	1

City reports for week ended September 20, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	0		0	0	0	1
Tennessee:								
Memphis	3	4	2		1	0	0	2
Nashville	0	3	2		0	0	2	2
Alabama:								
Birmingham	0	4	0		2	0	1	5
Mobile	0	1	0		1	0	0	1
Montgomery	0	3	0	2		0	1	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0			0	0	
Little Rock	0	0	1		0	0	0	0
Louisiana:								
New Orleans	0	8	9	1	1	0	0	7
Shreveport	0	0	1		0	0	0	0
Oklahoma:								
Tulsa	0	3	1			0	0	
Texas:								
Dallas	0	9	3	1	1	0	1	0
Fort Worth	0	2	1		0	0	0	6
Galveston	0	0	0		0	0	0	2
Houston	0	5	3		0	0	0	2
San Antonio	0	2	1		0	0	0	2
MOUNTAIN								
Montana:								
Billings	0	0	0		0	0	0	0
Great Falls	2	0	0		0	0	0	0
Helena	0	0	0		0	0	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	0	0	2
Colorado:								
Denver	0	10	3		2	0	2	5
Pueblo	0	1	0		0	5	2	3
New Mexico:								
Albuquerque	0	0	1		0	1	0	0
Arizona:								
Phoenix	0	0	0		0	0	0	1
Utah:								
Salt Lake City	3	3	0		0	0	1	2
Nevada:								
Reno	0	0	0		0	0	0	1
PACIFIC								
Washington:								
Seattle	4	3	0			3	5	
Spokane	5	2	2			1	0	
Tacoma	2	2	0		0	0	0	2
Oregon:								
Portland	3	6	0		0	2	3	2
Salem	4	0	1		0	0	1	0
California:								
Los Angeles	4	25	2	5	0	3	4	12
Sacramento	2	2	0		0	1	10	0
San Francisco	14	12	2		0	1	2	2

City reports for week ended September 20, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
NEW ENGLAND											
Maine:											
Portland	0	1	0	0	0	0	1	1	0	8	22
New Hampshire:											
Concord	0		0				0				
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	0	2
Burlington	1	0	0	0	0	0	0	0	0	0	6
Massachusetts:											
Boston	20	11	0	0	0	8	3	2	0	24	198
Fall River	1	0	0	0	0	2	1	1	1	3	25
Springfield	1	1	0	0	0	0	0	1	0	1	39
Worcester	3	10	0	0	0	0	0	0	0	7	42
Rhode Island:											
Pawtucket	1	0	0	0	0	0	0	0	0	0	9
Providence	2	2	0	0	0	4	2	0	1	11	54
Connecticut:											
Bridgeport	2	0	0	0	0	3	0	0	0	1	22
Hartford	1	6	0	0	0	2	1	0	0	4	41
New Haven	1	1	0	0	0	1	1	0	0	2	38
MIDDLE ATLANTIC											
New York:											
Buffalo	7	4	1	0	0	6	2	4	2	32	120
New York	35	16	0	0	0	95	38	13	4	113	1,171
Rochester	2	8	0	0	0	1	1	0	0	10	61
Syracuse	2	2	0	0	0	0	0	0	0	32	37
New Jersey:											
Camden	1	1	0	0	0	0	1	1	0	0	24
Newark	4	5	0	0	0	11	3	1	0	18	88
Trenton	1	3	0	0	0	4	1	0	0	0	32
Pennsylvania:											
Philadelphia	23	37	0	0	0	30	11	6	2	17	456
Pittsburgh	16	23	0	0	0	8	4	8	2	16	158
Reading	0	0	0	0	0	2	1	0	0	1	18
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	6	5	0	0	0	7	3	0	0	2	114
Cleveland	14	22	0	0	0	10	3	3	2	38	173
Columbus	4	1	0	9	0	4	0	1	0	3	75
Toledo	4	3	0	1	0	2	2	1	0	6	66
Indiana:											
Fort Wayne	1	0	1	0	0	1	1	0	0	0	29
Indianapolis	5	2	1	0	0	2	3	0	0	8	
South Bend	2	2	0	0	0	1	0	1	0	1	18
Terre Haute	1	0	0	0	0	0	1	1	0	0	18
Illinois:											
Chicago	45	52	0	4	0	44	6	3	1	57	641
Springfield	0	0	0	0	0	1	1	1	0	1	13
Michigan:											
Detroit	34	31	0	1	0	26	4	3	1	50	258
Flint	6	8	1	1	0	0	1	1	0	2	23
Grand Rapids	4	7	0	0	0	2	0	0	0	0	34
Wisconsin:											
Kenosha	1	2	0	0	0	0	0	0	0	0	13
Madison	0	1	0	0			0	0		1	
Milwaukee	13	4	0	0	0	9	1	3	0	31	99
Racine	3	8	0	0	0	1	0	0	0	5	16
Superior	1	1	0	0	0	0	0	0	0	0	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth	5	0	0	0	0	3	0	0	0	8	20
Minneapolis	22	3	0	0	0	6	1	2	0	6	100
St. Paul	9	1	1	0	0	2	1	1	0	8	44
Iowa:											
Davenport	1	0	0	1			0	0		0	
Des Moines	3	2	0	0			0	0		0	19
Sioux City	0	5	0	0			0	1		1	
Waterloo	1	1	0	0			0	0		1	
Missouri:											
Kansas City	5	0	0	0	0	4	2	1	1	8	79
St. Joseph	0	3	0	0	0	0	0	0	0	0	22
St. Louis	12	4	0	1	0	8	5	7	0	0	142

City reports for week ended September 20, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
WEST NORTH CENTRAL—contd.											
North Dakota:											
Fargo	1	0	0	0	0	1	0	3	0	3	12
Grand Forks	0	0	0	0			0	0		0	
South Dakota:											
Aberdeen	0	1	0	0			0	0		0	
Sioux Falls	1	1	0	2			1	2		0	7
Nebraska:											
Omaha	2	6	0	10	0	3	0	0	0	0	56
Kansas:											
Topeka	2	0	0	0	0	0	0	0	0	1	17
Wichita	2	0	0	0	0	1	2	0	0	1	26
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	0	0	0	0	0	1	2	1	0	28
Maryland:											
Baltimore	7	3	0	0	0	16	8	8	2	24	224
Cumberland	0	0	0	0	0	0	0	0	0	0	4
Frederick	0	1	0	0	0	0	0	1	0	0	4
Dist. of Columbia:											
Washington	7	3	0	0	0	10	3	4	1	2	112
Virginia:											
Lynchburg	0	0	0	0	0	0	0	2	0	0	10
Norfolk	1	4	0	0	0	0	0	4	1	0	
Richmond	5	4	0	0	0	1	1	0	0	0	40
Roanoke	2	0	0	0	0	0	0	0	0	2	14
West Virginia:											
Charleston	3	1	0	0	0	0	0	2	0	1	12
Wheeling	1	1	0	0	0	1	0	0	0	1	17
North Carolina:											
Raleigh	0	2	0	0	0	0	0	1	0	3	11
Wilmington	1	1	0	0	0	1	0	0	0	2	17
Winston-Salem	3	1	0	0	0	1	1	0	0	0	16
South Carolina:											
Charleston	0	1	0	0	0	1	2	4	0	0	20
Columbia	0	1	0	0	0	1	0	0	0	0	19
Georgia:											
Atlanta	5	2	0	0	0	10	3	3	2	1	79
Brunswick	0	0	0	0	0	0	0	3	0	0	8
Savannah	0	1	0	0	0	2	0	4	0	0	26
Florida:											
Miami	0	0	0	0	0	1	1	0	0	0	22
St. Petersburg	0		0		0	0	0		0		7
Tampa	0	0	0	0	0	1	1	0	0	3	22
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	0	0	0	0	0	0	0	0	0	20
Tennessee:											
Memphis	2	3	0	0	0	3	5	2	1	2	89
Nashville	2	1	0	0	0	3	4	2	0	0	27
Alabama:											
Birmingham	4	1	0	0	0	4	4	3	0	1	56
Mobile	0	1	0	0	0	0	0	1	0	0	27
Montgomery	1	0	0	0			0	0		0	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0			1	0		0	
Little Rock	0	0	0	0	0	1	2	0	0	0	
Louisiana:											
New Orleans	2	8	0	0	0	10	4	13	0	0	120
Shreveport	0	2	0	0	0	2	0	1	0	0	29
Oklahoma:											
Tulsa	2	3	0	1			2	0		0	
Texas:											
Dallas	3	1	0	0	0	2	3	2	1	2	40
Fort Worth	1	0	0	0	0	1	0	1	1	0	36
Galveston	0	1	0	0	0	0	0	1	1	0	10
Houston	1	0	0	0	0	4	0	1	0	0	71
San Antonio	0	2	0	0	0	9	1	0	0	0	59

City reports for week ended September 20, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	9	5
Great Falls	0	1	0	0	0	0	0	0	0	2	4
Helena	0	3	0	0	0	0	0	0	0	0	7
Missoula	1	0	0	0	0	0	0	0	0	0	3
Idaho											
Boise	0	0	0	0	0	0	0	0	0	0	6
Colorado:											
Denver	5	3	0	0	0	7	2	0	0	18	65
Pueblo	0	0	0	0	0	1	1	0	0	2	11
New Mexico:											
Albuquerque	0	0	0	0	0	4	1	2	1	0	12
Arizona:											
Phoenix	1	1	0	0	0	1	0	0	0	0	13
Utah:											
Salt Lake City	3	1	0	0	0	2	2	0	0	21	
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	5
PACIFIC											
Washington:											
Seattle	5	19	0	0			2	1		12	
Spokane	3	0	1	0			0	0		4	
Tacoma	1	3	1	2	0	0	0	1	0	0	17
Oregon:											
Portland	4	0	2	0	0	1	1	2	0	4	55
Salem	0	0	0	0	0	0	1	0	0	0	
California:											
Los Angeles	11	6	1	0	0	23	2	1	0	32	253
Sacramento	1	1	1	0	0	4	1	4	1	8	20
San Francisco	8	4	0	0	0	9	2	0	0	7	134

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis: Cases	Poliomyelitis: Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	1	12	0
Massachusetts:									
Boston	0	0	0	0	0	0	3	13	3
Rhode Island:									
Providence	0	0	0	0	0	0	1	2	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	0	0	0	0	1	3	0
New York [1]	6	5	4	5	0	0	19	4	0
Rochester	0	0	0	0	0	0	1	13	6
Syracuse	0	0	0	0	0	0	1	9	1
New Jersey:									
Trenton	1	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	1	1	0	0	0	0	2	7	0
Pittsburgh	1	0	0	0	0	0	1	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	0	0	0	0	4	0
Cleveland	0	0	0	0	0	0	2	20	1
Columbus	1	1	1	1	1	1	0	2	0
Toledo	0	0	0	0	0	0	0	3	0

[1] Typhus fever, 2 cases and 1 death: 1 case at New York City, N. Y.; 1 case at Savannah, Ga.; and 1 death at Mobile, Ala.

City reports for week ended September 20, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL—con.									
Indiana:									
Indianapolis	3	1	0	0	0	0	0	6	0
Illinois:									
Chicago	2	1	0	0	0	0	3	16	0
Springfield	1	0	0	0	0	0	0	1	0
Michigan:									
Detroit	3	1	1	0	0	0	4	3	1
Grand Rapids	0	0	0	0	0	0	0	1	0
Wisconsin:									
Madison	0	0	0	0	0	0	0	1	0
Milwaukee	0	0	0	0	0	0	0	6	1
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	0	0	0	0	0	0	4	0
St. Paul	0	0	1	0	0	0	1	1	0
Iowa:									
Davenport	0	0	0	0	0	0	0	1	0
Des Moines	0	0	0	0	0	0	1	5	0
Sioux City	0	0	0	0	0	0	0	5	2
Waterloo	0	0	0	0	0	0	1	2	0
Missouri:									
Kansas City	0	1	0	0	0	0	0	4	0
St. Louis	2	1	0	0	0	0	1	1	0
North Dakota:									
Grand Forks	0	0	0	0	0	0	0	1	0
South Dakota:									
Sioux Falls	0	0	0	0	0	0	1	2	0
Nebraska:									
Omaha	0	0	0	0	0	0	1	2	0
Kansas:									
Topeka	0	0	0	0	0	0	0	5	0
Wichita	0	0	0	0	0	0	0	2	0
SOUTH ATLANTIC [1]									
Maryland:									
Baltimore	0	0	1	1	0	0	2	0	0
Virginia:									
Norfolk	0	0	0	0	0	0	0	2	0
Richmond	0	0	0	0	0	1	1	0	0
North Carolina:									
Raleigh	0	0	0	0	3	3	0	0	0
Winston-Salem	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	6	1	0	0	0
Columbia	0	1	0	0	0	0	0	0	0
Georgia:									
Atlanta	1	1	0	0	1	1	0	0	0
Brunswick	0	0	0	0	1	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	2	1	0	0	0	0	1	0
Alabama:									
Birmingham	0	0	0	0	1	0	0	0	0
Mobile [1]	0	0	0	0	1	1	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	1	0	0	0	0	0	0
Louisiana:									
New Orleans	0	0	0	0	5	0	0	0	0
Shreveport	0	0	0	0	0	0	0	1	0
Texas:									
Dallas	0	0	0	0	1	0	1	0	0
Fort Worth	0	0	0	0	0	0	0	1	0
Galveston	0	0	0	0	0	0	0	2	0
Houston	0	0	0	0	0	0	0	1	0
San Antonio	0	0	0	0	0	0	0	1	0

[1] Typhus fever, 2 cases and 1 death: 1 case at New York City, N. Y.; 1 case at Savannah, Ga.; and 1 death at Mobile, Ala.

City reports for week ended September 20, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
MOUNTAIN									
Montana:									
Great Falls	0	0	0	0	0	0	1	1	0
Colorado:									
Pueblo	0	0	0	0	0	0	0	2	0
Utah:									
Salt Lake City	3	0	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Tacoma	0	1	0	0	0	0	1	0	0
California:									
Los Angeles	0	0	0	0	0	0	1	19	0
San Francisco	2	1	0	0	0	0	0	16	0

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended September 20, 1930, compared with those for a like period ended September 21, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, August 17 to September 20, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929
98 cities	34	61	[2] 40	62	41	[3] 64	45	66	[4] 47	75
New England	40	63	[5] 53	45	35	[3] 46	55	47	[4] 31	49
Middle Atlantic	28	58	31	54	31	45	28	41	38	54
East North Central	41	69	46	75	49	86	64	95	75	96
West North Central	25	25	27	25	34	38	55	58	47	64
South Atlantic	37	75	[6] 60	90	60	92	62	133	42	114
East South Central	13	55	13	116	54	75	27	116	27	137
West South Central	67	141	71	137	60	133	49	61	67	149
Mountain	43	26	[7] 70	17	43	70	34	26	26	70
Pacific	26	29	19	27	38	34	26	22	14	19

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930 and 1929, respectively.
[2] Hartford, Conn., Columbia, S. C., and Helena, Mont., not included.
[3] Pawtucket, R. I., not included.
[4] Concord, N. H., not included.
[5] Hartford, Conn., not included.
[6] Columbia, S. C., not included.
[7] Helena, Mont., not included.

Summary of weekly reports from cities, August 17 to September 20, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

MEASLES CASE RATES

	Week ended—									
	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929
98 cities	28	20	[2] 20	14	24	[3] 12	16	16	[4] 16	15
New England	60	38	[5] 19	20	33	[3] 21	38	16	[4] 18	31
Middle Atlantic	33	13	23	8	28	7	20	12	17	7
East North Central	21	33	8	22	13	16	9	20	14	17
West North Central	19	8	27	8	30	2	15	6	19	6
South Atlantic	18	0	[6] 30	13	26	2	5	7	20	7
East South Central	7	14	13	7	27	14	7	7	0	7
West South Central	0	4	11	8	0	4	4	11	0	8
Mountain	26	52	[7] 35	44	51	26	34	61	43	26
Pacific	47	39	35	19	40	46	19	39	21	51

SCARLET FEVER CASE RATES

98 cities	33	41	[2] 42	41	43	[3] 52	51	54	[4] 62	68
New England	47	45	[5] 53	38	55	[3] 83	51	52	[4] 72	49
Middle Atlantic	27	15	28	15	25	25	27	16	47	25
East North Central	35	63	48	63	47	70	85	90	91	121
West North Central	34	58	42	41	57	67	34	58	44	92
South Atlantic	27	34	[6] 67	45	66	64	51	47	40	66
East South Central	34	68	115	34	67	41	40	96	40	28
West South Central	37	65	15	72	67	31	26	91	56	72
Mountain	86	44	[7] 88	61	34	17	77	70	69	113
Pacific	33	51	31	46	33	77	73	72	78	68

SMALLPOX CASE RATES

98 cities	2	3	[2] 2	4	3	[3] 4	3	3	[4] 5	5
New England	0	0	[5] 0	0	0	[3] 0	0	0	[4] 0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	0	4	0	10	3	10	2	4	9	10
West North Central	8	6	8	4	13	2	27	8	21	6
South Atlantic	2	0	[6] 0	0	4	0	0	2	0	0
East South Central	0	0	0	0	0	0	0	0	0	0
West South Central	7	8	4	4	0	0	0	0	0	0
Mountain	0	26	[7] 0	0	0	9	0	9	0	52
Pacific	12	17	12	14	14	14	9	12	5	17

TYPHOID FEVER CASE RATES

98 cities	19	30	[2] 25	27	21	[3] 18	27	21	[4] 22	22
New England	16	27	[5] 12	29	11	[3] 2	20	16	[4] 11	13
Middle Atlantic	14	34	21	28	22	20	25	18	16	14
East North Central	9	12	10	13	12	13	17	10	11	11
West North Central	21	13	19	23	13	12	21	17	28	6
South Atlantic	55	51	[6] 82	52	53	34	64	34	62	26
East South Central	88	103	47	103	54	55	54	89	54	0
West South Central	26	88	71	50	49	15	56	50	67	84
Mountain	26	70	[7] 14	17	9	44	60	70	0	340
Pacific	7	5	9	12	9	14	5	19	17	7

[2] Hartford, Conn., Columbia, S. C., and Helena, Mont., not included.
[3] Pawtucket, R. I., not included.
[4] Concord, N. H., not included.
[5] Hartford, Conn., not included.
[6] Columbia, S. C., not included.
[7] Helena, Mont., not included.

Summary of weekly reports from cities, August 17 to September 20, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

INFLUENZA DEATH RATES

	Week ended—									
	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929
91 cities	3	3	[2] 4	2	3	[3] 3	3	3	[4] 3	2
New England	0	2	[5] 0	0	0	[3] 2	0	0	[4] 2	2
Middle Atlantic	3	3	3	2	3	2	4	2	2	0
East North Central	1	4	4	2	2	6	3	2	3	2
West North Central	0	0	3	0	6	0	0	6	0	6
South Atlantic	7	2	[6] 7	2	7	4	2	2	0	2
East South Central	0	0	7	0	0	7	22	7	29	7
West South Central	4	8	8	4	11	0	0	12	8	0
Mountain	9	9	[7] 0	9	9	0	0	9	17	9
Pacific	9	0	3	0	0	3	0	0	0	9

PNEUMONIA DEATH RATES

	Aug. 23, 1930	Aug. 24, 1929	Aug. 30, 1930	Aug. 31, 1929	Sept 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929
91 cities	46	54	[2] 53	55	55	[3] 57	55	55	[4] 58	54
New England	51	25	[5] 48	49	51	[3] 44	62	36	[4] 51	29
Middle Atlantic	55	60	60	61	68	75	67	66	68	59
East North Central	28	47	50	51	36	44	43	47	43	47
West North Central	35	48	38	33	50	57	44	45	74	39
South Atlantic	48	73	[6] 52	56	62	64	53	52	51	66
East South Central	74	37	52	52	103	75	29	90	81	67
West South Central	61	63	38	98	51	31	61	55	50	51
Mountain	51	52	[7] 53	44	51	52	120	70	112	104
Pacific	49	50	55	28	34	31	31	41	49	57

[2] Hartford, Conn., Columbia, S. C., and Helena, Mont, not included.
[3] Pawtucket, R. I., not included.
[4] Concord, N. H., not included.
[5] Hartford, Conn., not included.
[6] Columbia, S. C., not included.
[7] Helena, Mont., not included.

FOREIGN AND INSULAR

AUSTRALIA

Infant mortality—Year 1929.—During the year 1929 the infant mortality rates per 1,000 births in the States of Australia were as follows:

Year 1929

State	Infant mortality rate per 1,000 births	State	Infant mortality rate per 1,000 births
New South Wales	56.44	South Australia	40.93
Victoria	47.23	Western Australia	56.24
Queensland	46.03	Tasmania	53.16

CANADA

Provinces—Communicable diseases—Week ended September 13, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended September 13, 1930, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia	2			1		
New Brunswick						7
Quebec	2			1		18
Ontario	2		2	45	6	8
Manitoba				5		6
Saskatchewan	1			10	1	5
Alberta				17		2
British Columbia	2	12			1	
Total	9	12	2	79	8	46

[1] No disease included in the table was reported during the week.

Ontario Province—Communicable diseases—Five weeks ended August 30, 1930.—During the five weeks ended August 30, 1930, and in the corresponding period of the year 1929, certain communicable diseases were reported in the Province of Ontario, Canada, as follows:

Disease	1929		1930	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	8	1	27	4
Chancroid	1		1	
Chicken pox	228		218	
Conjunctivitis			1	
Diphtheria	189	9	225	13
Dysentery	2	1	1	
Erysipelas	1	1		1
German measles	2		14	
Goiter			4	3
Gonorrhea	223		204	
Influenza	1	2	9	2
Lethargic encephalitis				1
Measles	403	1	201	
Mumps	116		28	
Paratyphoid fever	1		2	
Pneumonia		102		74
Poliomyelitis	104	5	175	16
Puerperal septicemia			2	2
Scarlet fever	145		182	3
Septic sore throat	4		3	
Smallpox [1]	17		22	
Syphilis	178	2	187	1
Tetanus		1	1	1
Tuberculosis	157	58	98	91
Typhoid fever	102	3	71	
Undulant fever			10	
Whooping cough	486	2	367	3

[1] Cases of smallpox for the 5-week period of 1930 were distributed as follows: Ottawa, 9; Orangeville, 3; Hanover, 2; Kingston, 2; Nairn, 2; North Bay, 2; Gloucester, 1; and Humberstone, 1.

Quebec Province—Communicable diseases—Week ended September 20, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended September 20, 1930, as follows:

Disease	Cases	Disease	Cases
Chicken pox	4	Poliomyelitis	3
Diphtheria	22	Scarlet fever	52
Erysipelas	2	Smallpox	1
German measles	1	Tuberculosis	44
Measles	19	Typhoid fever	30
Mumps	12	Whooping cough	40
Ophthalmia neonatorum	1		

MEXICO

Vera Cruz—Deaths from certain diseases—Six weeks ended August 23, 1930.—During the six weeks ended August 23, 1930, deaths from certain diseases were reported in Vera Cruz, Mexico, as follows:

Disease	Week ended—					
	July 19, 1930	July 26, 1930	Aug. 2, 1930	Aug. 9, 1930	Aug. 16, 1930	Aug. 23, 1930
Bronchitis	1	1		1		2
Cancer	3	1		1		1
Cerebrospinal meningitis	2				1	
Dysentery			1			
Gastrointestinal disorders	12	14	6	11	11	13
Hookworm disease				1	1	
Malaria		1	1	1	1	2
Measles	1			1		
Pneumonia	3	7		2	1	6
Syphilis		2			2	
Tetanus		1	1			
Tuberculosis	6	3	3	8	3	
Typhoid fever	1		1	1		2

TRINIDAD (BRITISH WEST INDIES)

Port of Spain—Vital statistics (comparative)—July, 1930.—The following statistics for the month of July for the years 1929 and 1930 are taken from a report issued by the Public Health Department of Port of Spain, Trinidad:

	July, 1929	July, 1930		July, 1929	July, 1930
Number of births	178	147	Deaths under 1 year	30	14
Birth rate per 1,000 population	31.6	25.7	Infant mortality rate per 1,000 births	168.5	95.2
Number of deaths	150	80			
Death rate per 1,000 population	26.6	14.00			

VIRGIN ISLANDS

Communicable diseases—August, 1930.—During the month of August, 1930, cases of certain communicable diseases were reported in the Virgin Islands, as follows:

St. Thomas and St. John:	Cases	St. Croix:	Cases
Gonorrhea	5	Gonorrhea	1
Syphilis	18	Leprosy	1
Tuberculosis, chronic pulmonary	1	Syphilis	11

YUGOSLAVIA

Communicable diseases—August, 1930.—During the month of August, 1930, certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	110	13	Puerperal fever	9	1
Cerebrospinal meningitis	4	2	Rabies	2	2
Diphtheria and croup	631	88	Scarlet fever	714	124
Dysentery	468	45	Tetanus	36	20
Lethargic encephalitis		1	Typhoid fever	688	54
Measles	110	13	Typhus fever	2	1
Poliomyelitis	1	1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27
Afghanistan	C						[1] P						P					
China:																		
Canton	C			3	2		2	1										
	D						1											
Shanghai	C													8	4			
Swatow	C			3	7					1								
India	C	10,817	41,462	56,311	37,102	6,728	5,520	5,701	8,172	7,199								
	D	5,866	27,906	44,878	25,711	3,712	3,095	3,133	3,882	3,676								
Bassein	C		7	7											1			
	D		5	5														
Bombay	C	4								3	2	3	6					
	D									2	1	1	4					
Calcutta	C	354	647	609	327	81	53	49	37	18	10	17	18	8	10			
	D	220	414	372	179	54	28	23	23	7	7	10	6	3	3			
Negapatam	C				1													
	D				1													
Rangoon	C	2	1	9	6	1				1					1			
	D	2	1	3	4	1				1								
India (French):																		
Chandernagor	C	1	6	6	3			1										
	D	3	5	6	2													
Karikal	C	12	1		3													
	D	9	1		3													
India: Portuguese	C											1						
Indo-China (see also table below):																		
Pnompenh	C		2	1	40	9	16	7		5	3	3						
	D	6		5	18	6	9	5	2	3	2	1						
Saigon and Cholon	C	14	76	160	48	7	1	1	1	2	2	1						
	D	6	55	101	23	3					1							

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27
Philippine Islands: [2]																		
Ports—																		
Cebu	C				1	20	13	13	9	5	4			1	1			
	D					9	7	12	8	4	4			1	1			
Iloilo	C						1	11	17	9	19	32	4	3	4	1	2	1
	D							9	13	10	18	19	9	4	5	2	3	2
Manila	C			1							1			16	13	5	4	2
	D													5	6	1		
Provinces—																		
Antique	C									14	3		3	2	21	12	8	12
	D									7	3		2	1	10	12	7	8
Bohol	C										54	54	31	24	28	4	1	
	D										29	32	15	11	11	2		
Bulacan	C				3		1	1	2	1				1	1	1		
	D				1									1				
Capiz	C							2	1	1	1			1				
	D							1	1	1	1							
Cebu	C			1	355	313	222	115	63	55	26	4		1	16	8		
	D			1	170	131	83	60	29	32	15	3		1	6	4		
Iloilo	C				2	20	45	85	159	143	209	127	88	74	57	66	46	18
	D				1	10	23	64	96	77	143	91	64	51	44	37	26	15
La Union	C						1											
Leyte	C				47	11												
	D				19	11												
Masbate	C				10	14	32	25	21	15	19							
	D				3	2	18	5	10	5	9							
Misamis, Occidental	C					1	2											
	D					1	2											
Negros, Occidental	C			10	140	62	163	172	171	151	79	45	72	40	47	21	15	8
	D			7	88	42	90	122	114	97	64	33	47	31	32	18	9	6
Negros, Oriental	C					1	1	6	15	6	2							
	D						1	3	9	1	3							
Nueva Acija	C								1									
	D								1									

Pampanga	C				2	2								1				
Pangasinan	C					2		1		1								
	D					2				1								
Rizal	C				1		1											
	D				1		1											
Samar	C										5	3	10			2	1	4
	D										5	3	8			2		4
Surigao	C										15	2	21	3				
	D										9	2	10	3				
Tarlac	C									1								
Siam	C	1	29	33	27	8	3	8	1		1	1	15					
	D		13	21	19	4	1	3	1		1		1					
Bangkok	C	2	15	9	12		3	4	1	1		1						
	D	1	4	3	5		1	1	1	1		1						
Nagara Pathom	C		10															
	D		2															
Songkla	C						8		2									
	D						4		2									
On vessel:																		
S. S. Sassari at Massoua, from Jeddah	C			1														
	D			1														
On small boat at Port Cebu, from Bantayan Island	C				1													
	D				1													

Place		February, 1930	March, 1930	April, 1930	May, 1930			June, 1930			July, 1930			August, 1930	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):															
Annam [3]	C	4	52	60		20	3	2	14				1		3
Cambodia [3]	C	90	81	24	5	31	52	56	88				43	37	22
Cochin-China [3]	C	65	82	48	188	224	259	147	126				46	22	5

[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20
Algeria:																	
Algiers	C						1	2			1		6	1	2	6	2
Constantine	C				1	1											
Oran	C							2	1	1	1	1	1	1	2	3	
Philippeville	C														1		
Azores: Ponta Delgada	C		8														
	D		5														
Belgian Congo	C					2				1		1		2	3		
	D					2				1		1			3		
British East Africa (see also table below):																	
Tanganyika	C		44														
	D		20														
Uganda	C	98	117	227	406		50	100	78	52	67						
	D	87	105	195	328		47	97	69	50	64						
Canary Islands: Las Palmas	D										1						
Ceylon:																	
Colombo	C	4	1	6	1	1	2					1	1	2			
	D	4	1	5	1	1	2					1	1	3			
Plague-infected rats		2	4		1												
Chile: Antofagasta	C	1	1														
	D	2	1														
China: Manchuria—Tungliau and Nungan	C												30			29	P
Dutch East Indies:																	
Batavia and West Java	C	124	87	82	98	19	25	18	22	19	30	20					
	D	122	81	82	98	19	25	18	22	19	30	20					
Plague-infected rats		3	8	5	4						1						
Java and Madura	D	223	173	185	202	55	56	58	48	45	51						
Ecuador (see table below).																	
Egypt:																	
Alexandria	C	4	2	13	19	8	8	3	4	2	2	4	3	3	3	2	2
	D	1	2	3	9	2	3	2	3	2	1	3		5	1	2	
Assiout	C		14	20	9	1	1										
	D		5	5	3	1	1										
Beheira	C	4															

Beni-Suef	C	4											1				
Dakahlieh	C	5	5	11	1												
	D	1		2													
Gharbieh	C		1							3							
	D		1							1							
Girga	C		1				1							1			
Minieh	C			7	10	2	1										
	D			1	1												
Port Said	C		1	2	2				1	1							
France:																	
Marseille	C													2	2	1	
St. Ouen	C							1									
	D							1									
Gambia	C												4				
	D												4				
Greece (see also table below):																	
Patras	C	1			1			1									
Pyrgos	C	1															
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats					1												
India	C	4,087	2,215	648	240	70	75	87	145	145							
	D	3,344	1,960	635	187	46	46	62	102	98							
Bassein	C	3												1		1	
	D	1												1		2	
Bombay	C	7	4	6	3				1						1		
	D	5	8	5	2				1						1		
Plague-infected rats		86	108	81	26	13	14	10	15	10	8	9	9	12	9	11	
Madras Presidency	C	157	44	38	39	10	1	10	26	35	21	7					
	D	87	19	11	22	4	1	9	17	13	9	1					
Rangoon	C	3	5	4	1				2	2	1			2	1	5	
	D	3	4	3	1				2	1	1			2	1	4	
Plague-infected rats		3	4	5	1	2	2		2	4		2	1	2			
India (Portuguese)	D			7								P					
Indo-China (see also table below):																	
Pnompenh	C		3	3	6		1	1			2		2	2	1		
	D	13	4	1	7		1	1									
Saigon and Cholon	C	1		1	2							1			1		
	D	1			1												
Iraq: Baghdad	C	7	6	37	28	10	4	2	2	4	3	2					
	D	4	2	18	15	5		1	1		2	1					
Japan: Osaka (vicinity of)—Plague-infected rats		4	3														
Kwang-Chow-Wan	C	7	37	34	31				4			1					
Madagascar (see also table below): Tamatave	C		1		1											P	
Morocco	C	55	121	71	3				1		8	7					
	D	18	45	34	4						1	1					
Nigeria: Lagos	C	13		2	5	1				2	1	3	1		1		
	D	5		2	5	1				2	1	3	1				
Plague-infected rats		25	7	17	11	2	3	6	7			4	4				
Senegal (see table below).																	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20
Siam	C	16	5	5						2	3						
	D	15	6	4						1	3						
Bangkok	C	5		5						1	2						
	D	4		4							2						
Nagara Pathom	C	1	10														
	D	1	9														
Nagara Rajsima	C	1	1							1			1		1		
	D	1	1							1			1		1		
Syria: Beirut	C				12		2	4	3		1		1	3	2		
Tripolitania	C											2					
Tunisia:																	
Sfax district	C		1	21	9				6		1						
Tunis	C	1	4	1	1		1	4									
	D				1		1										
Union of Socialist Soviet Republics:																	
Salsk Region	C				2			3	2	4		3					
	D				1			2	2	3		2					
Stavropol Region	C				1												
	D				1												
Union of South Africa:																	
Cape Province	C	1		P	1			1									
	D	1						1				1					
Orange Free State	C	5	1														
	D	3															
Transvaal	C	1															
	D	1															

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
British East Africa (see also table above):							
Kenya	C	85	16	171	107	97	27
Ecuador: Guayaquil	C	2	0	0	0		
	D	0	0	0	0		
Plague-infected rats		2	0	0	0		
Greece (see also table above)	C		1		1		
Indo-China (see also table above)	C	27	4		11	1	2
Madagascar (see also table above):							
Ambositra Province	C	25	14	1			
	D	20	12	1			
Antisirabe Province	C	38	46	19	3		
	D	36	45	19	3		
Itasy Province	C	4					
	D	4					
Miarinarivo Province	C	14	1	5	1		
	D	14	1	5	1		
Madagascar (see also table above)—Con.							
Moramanga Province	C	5	3	1	3		
	D	5	3		3		
Tananarive Province	C	52	39	15	16		
	D	52	38	14	16		
Senegal:							
Baol [1]	C	18	24	13	2	62	74
	D	8	12	11	2	48	20
Dakar [1]	C		2	52	53	140	90
	D		2	42	117	122	71
Louga [1]	C		33	54	60	138	49
	D		10	27	21	103	20
Thies [1]	C	3	12	21	52	54	34
	D	2	9	8	35	30	19
Tivaouane [1]	C	11	71	135	43	119	74
	D	8	38	69	28	70	40

[1] Incomplete reports.

SMALLPOX

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20
Algeria:																	
Algiers	C	5	1	3			1				1		2				
Constantine	C				1			1									
Oran	C	1															
Arabia: Aden	C	3	1			1											
Bolivia: La Paz.[1]																	
British East Africa (see also table below):																	
Tanganyika	C	103	57	409	1,610	64	4		100	26	51	44	121				
	D	7	14	70	301	13	2		27	4		3	30				
British South Africa:																	
Northern Rhodesia	C	9	1	59													
	D		2	9													
Southern Rhodesia	C		66	155	79	1	12	18									
	D		1	13													

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930				August, 1930					September, 1930		
						5	12	19	26	2	9	16	23	30	6	13	20
Canada:																	
Alberta	C	10	4				2	1	2	1							
Edmonton	C	4	3														
British Columbia—Vancouver	C	20	17	4	2	2	2	1	1	1	1		2			1	
Manitoba	C	4	4	10	4												
Ontario	C	100	77	82	47	3	5	6	10	8		5	4			6	
North Bay	C			1													
Ottawa	C	19	21	25	15	1	1	4	7	5	1	1		2	1	2	
Toronto	C			4	4		1									1	
Quebec	C				4	3					2		1				
Montreal	C									7							
Saskatchewan	C	47	41	39	22		2		3				8			1	
Regina	C			4													
Ceylon: Angoda, Western Province	C		6														
	D		2														
China:																	
Canton	C	6	3														
	D	2	3														
Chungking	C		P	P	1	P	P	P	P	P		P					
Foochow	C		P	P	P		P		P		P						
Hong Kong	C	38	18	12	4		2										
	D	25	23	9	3		1										
Manchuria—																	
Harbin	C		1	20	4												
Kwantung—Dairen	C		2	8	16	8											
	D			4	1												
Nanking	C	P	P	P	P		P	P	P	P	P	P	P				
Shanghai—																	
Foreigners only	C	2	3	2	5	1	1	1	1	3						18	
Including natives	D	10	10	5	3											2	
Swatow	D	6	3	6	4	1				1		2	1	1	1		
Tientsin	C	2	2	1													
Chosen (see table below).																	
Colombia:																	
Barranquilla	C	2	1							2							
Buenaventura	C		15	4	6	4	3	2	1		1	1					

Costa Rica:																	
Port Limon	C		6	2	2												
San Jose [2]	C	10	7	2													
Curacao (alastrim)	C	14	2	2	1	2					1						
Dutch East Indies:																	
Borneo	C	185	90	16	12		2										
	D	12	31	1	1												
Java—																	
Batavia and West Java	C	78	64	12	13	3	1	3	1	1		1	2			2	
	D	6	11	7	3	2	1	1	1	1		1	2			1	
East Java and Madura	C		4					1									
Sanggi Islands	C	5	160	26				11		36							
	D	1	24	5				3		2							
Sumatra	C	48															
	D	5															
Egypt: Port Said	C		1	1			2		1								
Great Britain:																	
England and Wales	C	1,700	1,427	1,417	926	156	138	126	109	70	86	95	93	99	106	75	
Ashton under Lyne	C	15	18	17	7		4	2	2					1			
Bradford	C		3	2		1											
Cardiff	C	2	3			2											
Leeds	C	16	2			1											
London	C	710	602	637	498	84	52	62	48	36	50	41	51	43	44	36	
London and Great Towns	C	1,239	• 1,066	1,078	753	127	96	102	83	61	73	71	80	79	84	51	
	D	3	3														
Sheffield	C	8	2														
Stoke-on-Trent	C	122	85	62	32	3	2	1	3	1	1					1	
Scotland	C				4		1								5		
	D						1										
Honduras: Naco	C															5	
India	C	39,320	34,843	22,835	12,9[illegible]2	2,258	2,006	1,853	1,5131	,313							
	D	9,109	6,983	5,451	3,531	733	580	577	458	368							
Bombay	C	718	430	218	113	17	15	11	7	6	2		2		1	1	
	D	431	270	151	79	13	9	9	2	5	2		2		1	2	
Calcutta	C	361	455	302	161	27	19	13	14	4		12	9		5	3	
	D	305	403	258	146	17	17	12	10	4		8	9		4	1	
Cochin	C	291	183	37	16			4	2	2	4	4	4	1	1		
	D	35	13	8	4									1			
Karachi	C	33	30	14	7				1	2		2				1	
	D	47	17	4	3					2		1					
Madras	C	173	133	72	35	6	10	17	16	19		9	10	9	11	6	
	D	36	27	15	10	4	1	3	4	3		5	3	1	1	1	
Moulmein	C	146	43	89	21	4	10	3	1				2	1			
	D	41	7	21	7	3	4	1	2				1			1	
Negapatam	C			1	2			1		2		2		1	2		
Rangoon	C	10	4	6	9	2	1	1		1	1	1					
	D	5		1	2												
Tuticorin	C			5	1												
Vizagapatam	C	69	6	5	1												
	D	18	2	3													

[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica, outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20
India (French):																	
Chandernagor	C	6	10	24	19	3	1	4									
	D	2	2	7	3	1	1	1								1	
Karikal	C	24	19	12	11	1		1			8		1		5		
	D	7	8	3	8	1		1			8		1		2		
Pondicherry Province	C	21	24	40	23	4	9	8	5	7	8		7		7	1	
	D	13	20	36	23	3	9	8	5	7	8		7		7	1	
India (Portuguese)	C	38	44	47	28	1				1	6	1					
	D	2	8	8	10				1	1							
Indo-China (see also table below):																	
Pnompenh	C			3				1									
	D		2		1			1				1					
Saigon and Cholon	C	3	5	3	1						1						
	D	1	5	2						1	1	1		1			
Iraq:																	
Baghdad	C		8	1	1	1	1	1				1					
	D		1	1				1				1					
Basra	C		1														
Mossoul Liwa	C		22	21	4	47	20										
	D		3	3	1	19	1										
Ivory Coast (see table below).																	
Jamaica (alastrim)	C			2													
Japan: Tokyo	C		1														
	D		1														
Macao	D	3	2	1													
Mexico (see also table below):																	
Jalisco (State) Guadalajara	D	22	20	7	15	3	1				1						
Juarez	C	2			6						2						
	D				1						1						
Mexico City and surrounding territory	C	106	99	80	77	10	12	4	11	2	3	3		7			
	D	31	47	32	17	2	3	1	2	1	3	2		1			
Progreso	C			1													
	D			1	1												

Morocco (see table below).																	
Nigeria: Lagos	C	1	1		1												
Poland	C		7	3	2												
Portugal:																	
Lisbon	C	7	8	8	10		7		6		6	19	25	7	8		
Oporto	C												1				
Rumania	C	2															
Siam	C		8	2		2		4									
	D		4					3									
Somaliland, British: Boales	C	2															
	D	6															
Spain	C				12		1	1	3	2						1	
Straits Settlements	C	5	5	11	9	1	2	7	1	1	1	1	5	1	2	2	
	D	1	2	3	2	1	1	1				1	1		1		
Sudan (Anglo-Egyptian)	C	60	42	19	67	8	1		3				42	102	5	20	1
	D	5	4	2	3		1						3	50	2		
Sudan (French) (see table below).																	
Switzerland: Berne Canton	C								1	1	1						
Syria (see table below).																	
Taiwan: Taihoku (see table below).																	
Tunisia: Tunis	C	3	4	2	2				1								
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P					P								
Orange Free State	C	P						P	P	P							
Transvaal	C	P									P	P					
Upper Volta	C	2	3	1	13												
Zanzibar	C	13															
On vessel:																	
S. S. Elysia, at Port Sudan, from Bombay	C		1														
S. S. Naldera, at Port Said	C			1													
S. S Manoa, from Honolulu to San Francisco	C					1											

Place		February, 1930	March, 1930	April, 1930	May, 1930			June, 1930			July, 1930			August, 1930	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (see also table above)	C	434	26	261		173	132	80	133				238	59	34
Ivory Coast	C		7												
Sudan (French)	C	213	609	521	40	56	178	76				34			
	D	11	49	36	7	7	18	18							
Syria: Beirut	C	18	17	19			7	6	1				2		
Taiwan: Taihoku	C	43	58	12											

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
British East Africa (see also table above):							
Kenya	C	12	175	174	171	142	186
Uganda	C	109	--	--	78	--	--
	D	99	--	--	69	--	--
Chosen	C	263	236	253	107	--	--
	D	71	53	53	35	--	--
Seishin	C	4	--	5	2	1	--
	D	1	--	1	1	--	--
France	C	23	8	58	51	--	--
Mexico: Durango (see also table above)	D	6	5	4	4	3	3
Morocco	C	74	17	10	18	5	3
Turkey	C	114	--	3	16	--	--
	D	42	--	--	--	--	--

TYPHUS FEVER

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	Week ended— June, 1930				July, 1930				August, 1930					September, 1930	
					7	14	21	28	5	12	19	26	2	9	16	23	30	6	13
Algeria:																			
Algiers	C	6	8	15	2	--	1	--	--	1	2	3	--	--	--	2	--	3	--
Constantine Department	C	11	15	6	11	--	1	--	--	1	1	--	--	--	--	3	--	--	--
Oran	C	--	--	3	--	--	--	4	--	2	1	--	--	1	--	--	1	--	--
Arabia: Aden	C	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	D	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bolivia: La Paz.[1]																			
Brazil: Porto Alegre	C	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bulgaria	C	9	15	6	1	--	9	6	--	4	5	1	--	1	--	--	--	2	--
	D	--	1	2	1	--	--	--	--	--	1	--	--	--	--	--	--	--	--
China:																			
Manchuria—Harbin (see also table below)	C	4	52	13	3	3	2	--	2	--	--	--	--	--	--	--	--	--	--
Shanghai	C	1	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--	--	--
Chosen (see table below).																			
Czechoslovakia (see table below).																			

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DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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THE PHARMACOLOGICAL ACTION OF CERTAIN PHENOL ESTERS, WITH SPECIAL REFERENCE TO THE ETIOLOGY OF SO-CALLED GINGER PARALYSIS

(Second Report)

By MAURICE I. SMITH, *Senior Pharmacologist, National Institute of Health, United States Public Health Service*, with the cooperation of E. ELVOVE, *Chemist, National Institute of Health*, and W. H. FRAZIER, *Chemist, Bureau of Industrial Alcohol*

In a preliminary communication (1) on the probable cause of the recent widespread epidemic of the condition clinically described as peripheral multiple neuritis, believed to have resulted from drinking adulterated fluid extract of Jamaica ginger, certain pharmacological and chemical evidence was presented to show that a phenol, firmly bound chemically with phosphoric acid, appeared to be the specific etiologic factor. The precise chemical nature of the phenolic compound was not revealed owing to the technical difficulties involved in its isolation and identification, though on the basis of the evidence presented it was suspected to be a phosphoric acid ester of one or more of the cresols.

Conclusive evidence on the pharmacological side of this problem was equally lacking, on account of the difficulties experienced in faithfully reproducing the human disease in the usual laboratory animals. After much indirect evidence had been obtained pointing to the cresol ester as the probable immediate cause of the paralysis in question, a successful experiment was conducted upon calves. This experiment showed that the human disease could be faithfully reproduced in the calf, as distinguished from the usual laboratory animals, and that the offending agent must have been contained in a technical grade of tricresyl phosphate, the peculiar action of which was either due to an impurity, to the substance itself, or to a combination thereof with some ginger constituent.

The obvious procedure to carry the solution of this problem to a satisfactory conclusion was to ascertain (*a*) whether an impurity in the technical tricresyl phosphate had anything to do with the paralysis, (*b*) which of the three isomers of tricresyl phosphate had this specific action on the motor nerve mechanism, (*c*) what the probable

reason was for the wide differences in species susceptibility, and lastly (*d*) what is the probable manner of action of the specific ester.

The present experiments are given in an attempt to answer at least in part some or all of these questions. Some of the results of this study indicate that the suggestion made in the first report to account for differences in species susceptibility solely on the ground of differences in hydrolytic cleavage of the ester in different animals is no longer tenable; and while this suggestion may still be in part correct, it will have to be modified to harmonize with the new facts.

EXPERIMENTAL

It will be recalled from the evidence presented in the first report (1) that the most important single lead to the solution of this problem was the observation that the suspected adulterated gingers presented uniformly and characteristically a toxicity in rabbits on oral administration which could not be accounted for by the ginger, the alcohol, or any of the well-known poisons. The chemical finding of phenols on saponification, acidification, and steam distillation directed our attention to stable phenolic compounds for two reasons: First because the phenols could only be obtained upon drastic hydrolysis; and, second, what is perhaps more important, because the symptom complex produced by the suspected ginger in rabbits resembled that of the systemic action of phenol or the cresols, yet differed from them in certain essential details. In particular the manifestations of the adulterated ginger poisoning in the rabbit were characterized by a long delay in the onset of the symptoms, sometimes by an interval of several days, and by evidence of very pronounced stimulation of the spinal cord, sometimes lasting over a period of several days before the condition finally terminated in respiratory paralysis. Furthermore, the toxicity of the suspected ginger extracts was far greater than could be accounted for by the phenols or cresols recoverable from them.

These early observations indicated, therefore, a plan of investigation aiming at a comparative qualitative and quantitative study of the toxicity and cumulative effects in the rabbit of as many phenolic esters as were procurable, for which there was no or only a limited amount of data in the literature.

Four phosphoric acid esters were procured for this work:

1. Triphenyl phosphate, technical grade; and
2. Tri-ortho cresyl phosphate, technical—both supplied by Celluloid Corporation, Newark, N. J.
3. Tri-ortho cresyl phosphate, C. P.; and
4. Tri-para cresyl phosphate, C. P.—both supplied by Eastman Kodak Co., Rochester, N. Y.

There is no reliable information available as to the degree of purity of the technical triphenyl phosphate, or the technical tri-ortho cresyl

phosphate. Some of the constants for the chemically pure tri-ortho cresyl phosphate as furnished by the manufacturers are as follows:

Specific gravity at 20° C	1.18
Boiling point at 20 mm. Hg	263–265° C.
Index of refraction	1.555

It is insoluble in water, and soluble in the usual lipoid solvents. P_2O_5 determination gave a value of 19.0, as against the theoretic value of 19.29 per cent. The Millon color value (11) of the cresol obtained by saponification, acidification, and steam distillation agreed with that given by a corresponding standard prepared from pure ortho cresol.

The toxicity and cumulative effects of these substances were studied in rabbits upon oral administration in a solution of approximately 80 per cent alcohol to make it comparable as far as possible with the adulterated ginger extracts previously used. The amount of alcohol administered at one time was usually not more than 6 c. c. per kilo and never more than 8 c. c. per kilo. For comparative purposes experiments were made with pure phenol and with the cresols similarly administered.

The results of this study are summarized in Tables 1 to 7.

The subcutaneous minimum lethal dose of phenol and of the several cresols for rabbits as given by Meili, (2) Tollens, (3) Wandel, (4) and in part confirmed by ourselves is about as follows:

Phenol	500 mg. per kilo
Ortho-cresol	450 mg. per kilo
Meta cresol	500 mg. per kilo
Para cresol	300 mg. per kilo

Administered orally the phenols are somewhat less toxic; thus Clarke and Brown (5) give the minimum lethal dose of phenol in rabbits on oral administration as 0.6 gm. per kilo.

When these figures are compared with the data given in Tables 1 to 7 it is at once obvious that tri-ortho cresyl phosphate stands out toxicologically apart, quantitatively as well as qualitatively, from either phenol, or the three isomeric cresols, or the phosphoric acid esters of phenol and para cresol. Thus from Table 5 it is evident that the minimum lethal dose of tri-ortho cresyl phosphate in the rabbit is 100 mg. per kilo, and as little as 50 mg. per kilo may result in definite symptoms which may occasionally prove fatal. The corresponding phosphoric acid ester of para cresol, on the other hand, failed to produce definite toxic effects in doses up to 700 mg. per kilo, as shown in Table 6. Furthermore, on repeated oral administration to rabbits, in daily sublethal doses, of some of the phenolic phosphoric acid esters it is shown that unlike tri-ortho cresyl phosphate they appear to be capable of detoxification at approximately the same rate as the corresponding phenols, while the action of the ortho ester is persistent and cumulative. Thus rabbits may survive as much as 1.4

to 1.5 grams per kilo of phenol, 1.4 grams per kilo of triphenyl phosphate, 1.2 to 1.7 grams per kilo of tricresol, 1.0 to 1.5 grams per kilo of ortho cresol, and 1.0 to 1.6 grams of tri-para cresyl phosphate, as shown in Tables 1, 2, 3, 4, and 7, respectively.

Summing up the results of the experiments on rabbits it may be concluded that tri-ortho cresyl phosphate differs from the corresponding cresol or the other cresols or phenol or their phosphoric acid esters, first in toxicity and second in the manner of action.[1] The difference in toxicity is sufficiently clear from the data in the tables. The difference in manner of action may be summarized as follows:

The systemic action of phenol or of the cresols is prompt. If a lethal dose is given, the symptoms appear within an hour or less, followed by coma and death in a very few hours. In case the dose is sublethal, recovery is equally prompt, so that by the following day the animal appears normal.

By contrast, the systemic action of tri-ortho cresyl phosphate is slow. The first effects following the administration of a lethal dose are none other than those of the alcohol in which it is administered. After an interval of from one to several days the animals develop a strikingly characteristic group of symptoms which are unmistakable. They peculiarly combine the manifestations of mild strychnine poisoning with some of the features of phenol poisoning. There is thus a moderate degree of hyperexcitability, but never convulsions; there is a spastic incoordinated gait developing into a generalized fine tremor of the entire musculature of the body; and along with this there is a certain degree of emprosthotonos. This may last for hours or days. With the hyperexcitability persisting, this state gradually passes into one of a flaccid muscular asthenia, involving more especially the muscles of the head and neck, so that the animal takes on a peculiar sitting posture with the head drooping, or perhaps more often and more characteristically an attitude of supporting the body in a state of more or less rigid emprosthotonos, with the aid of the chin as well as the fore and hind limbs. This finally passes into a general flaccid paralysis with impaired heart action, slow and shallow respirations, and death. Small sublethal doses produce in greater or less degree the early symptoms from which the animal eventually recovers. The effects of this poison when injected intramuscularly are essentially the same as when given orally. In no case has it been possible to elicit in the rabbit symptoms in any way comparable with the characteristic wrist drop and foot drop that the human ginger extract victims exhibited. The manifestations of the toxic action of tri-ortho cresyl phosphate in the rabbit are, however, exactly the same in every detail as those observed following the administration

[1] With the possible exception of tri-meta cresyl phosphate, which is not procurable at present and which we are having prepared for further work.

of about 6 c. c. to 8 c. c. per kilo of the adulterated gingers which were believed or known to have caused partial paralysis in man (1). On the basis of the rabbit experiments alone, therefore, there seems to be no question that the adulterated paralytic ginger extract contained tri-ortho cresyl phosphate in an approximate concentration of about 2 per cent. [2] [3]

THE ACTION OF TRI-ORTHO CRESYL PHOSPHATE IN THE MONKEY (*Macaccus rhesus*)

From the series of experiments on monkeys with the suspected gingers and fractions derived therefrom by saponification and distillation which constituted part of the first report, it was concluded that this species was refractory to the phenolic poison, but that when the poison was first hydrolyzed to split off the phenol part of the molecule it exhibited typical phenol poisoning in them. It was suggested, therefore, that the phenolic ester in its firm combination resisted hydrolysis in the monkey, and for that reason was harmless, while in the rabbit, by contrast, it was hydrolyzed with great ease. From the data given in the preceding section on the quantitative studies of the toxicity of tri-ortho cresyl phosphate in the rabbit it should be evident at once that this suggestion can be only partially correct, if at all. Assuming that a full lethal dose of this poison is at once hydrolyzed in the alimentary canal of the rabbit to yield quantitatively the corresponding ortho cresol, there would not be sufficient of the latter available to produce even mild symptoms of phenol poisoning. If the mechanism of action of the ortho ester in the rabbit or any other species is dependent upon hydrolysis and liberation of the ortho cresol it must be assumed that such liberation must take place in selected areas of the nervous system, for ortho cresol is no different pharmacologically from the related isomers. Indeed one may suppose that owing to the peculiar physical characteristics of the ortho isomer of the phosphoric acid esters of the cresols it has a special selective affinity for nervous tissues, and there it may exert its specific action as such, or on account of its firm chemical combination it is only slowly hydrolyzed, perhaps under the influence of specific enzymes, with the gradual liberation *in situ* of the corresponding ortho cresol. If some such mechanism as this is actually operative, the long latent period and its persistence of action become easily understandable, for under such special conditions it would

[2] The data on the toxicity of the paralytic ginger in rabbits reported in the first communication (1) were only approximately correct. The toxicity of the gingers was actually greater than that given in that paper, as subsequent work has shown. The error was due to the fact that the long latent period between the administration of the drug and the onset of symptoms was not realized and the gingers were administered in daily doses until definite symptoms developed, the dose in each case having been more than the minimum required one.

[3] Chemical analysis of this ginger for P_2O_5 confirms this conclusion, since 0.4082 gm. of P_2O_5 was found per 100 c. c. of the ginger. This corresponds to 2.1 per cent of tricresyl phosphate. This determination, however, gives no information as to which of the three isomeric cresols, if any, is in combination with the phosphoric acid.

probably not be subject to the same detoxification process that the body is capable of in its protective mechanism against the phenols, viz, conjugation in the liver to form water soluble glycuronates and sulphates, which are readily eliminated.

Whether such a suggestion will hold or not depends, of course, upon further work. The first requisite, however, would seem to be the production in the monkey, and indeed in all higher animals, of some symptoms referable to the central nervous system, if not the actual motor paralysis of the extremities as seen in man. The experiments on monkeys summarized in Table 8 show conclusively that a motor paralysis of the extremities can be produced uniformly in monkeys by the subcutaneous injection of the chemically pure as well as the technical tri-ortho cresyl phosphate. The failure to produce any symptoms whatever in the monkey with enormous doses of this poison given orally merely indicates that it is practically not absorbed from the alimentary canal in this species. Three monkeys (Nos. 3B, 23, and 7) received 3.0, 10.0, and 15.0 c. c. per kilo, respectively, of technical tri-ortho cresyl phosphate in 5 c. c. per kilo of alcohol by stomach tube, and in no case was there evidence of motor paralysis or indeed any untoward effects. Furthermore, one monkey (No. 21B) received 1.0 gm. per kilo of tri-para cresyl phosphate in alcohol *per os*, and it showed no effects other than of the alcohol Several days later the same monkey received a subcutaneous injection of 1.0 gm. per kilo of the para ester dissolved in olive oil. For several hours there was a slight suggestion of mild systemic phenol action with no further effects. On the other hand, monkeys receiving phenol or tri-cresol orally responded in the usual manner. Thus monkey No. 16A was given daily or every other day oral administrations of 5 c. c. per kilo of a 5 per cent solution of phenol in 80 per cent alcohol until a total of 10 doses had been given, or the equivalent of 2.5 gms. per kilo. Each administration was followed by the usual alcoholic intoxication and symptoms of moderate phenol poisoning, ending in prompt recovery. The same effects were noted in a monkey (2B) receiving 6 doses of 5 c. c. per kilo of 5 per cent tri-cresol in 80 per cent alcohol.[4]

It may thus be concluded from these experiments that the toxicity of phenol and the cresols in the monkey is of about the same order as in the rabbit, and that the free phenols are detoxified in the monkey probably by the same usual process of conjugation. Of the cresol phosphoric acid esters the para isomer is no more remarkable in its pharmacologic action in the monkey than in the rabbit, its toxicity in both species probably being determined by the concentration of

[4] From some experiments that need not be detailed here it appeared quite certain that the minimum lethal dose of phenol in alcohol in the monkey is about 0.5 gm. per kilo. That alcohol influences but little the toxicity of phenol was shown by Clarke and Brown (5) and Macht (6).

para cresol derived from the ester by hydrolysis. The ortho isomer, by contrast, can produce a partial motor paralysis of the upper and predominantly of the lower extremities after an interval usually of from 6 to 8 days. The essential differences in the reaction to this ester in the monkey as compared with man are as follows:

1. It does not appear to be readily absorbable from the gastro-intestinal canal.
2. The paralytic dose is not far from the minimum lethal dose.
3. The motor paralysis in the monkey is of relatively short duration as compared with that in the human cases.

With a better understanding of the action of this poison in the animal body some of these differences may at least in part become obliterated. Thus it is conceivable that by altering the mode of administration of this substance it may be possible to avert its lethal effects. And, lastly, the temporary character of the paralysis in the monkey is at least one hopeful outlook for the human victims.

THE ACTION OF TRI-ORTHO CRESYL PHOSPHATE IN DOGS

The experiments with this substance conducted upon dogs indicate that its behavior in this species is practically identical with that in the monkey. Oral administration of this substance to dogs appears to be without effect, corroborating the negative results with paralytic ginger in dogs previously reported (1). Subcutaneous or intramuscular injection of this ester direct or diluted with olive oil has resulted in a characteristic lameness, especially of the hind legs, with a typically ataxic gait after an interval of from 7 to 18 days. As in the monkey, however, the paralytic dose appears to be not far from the lethal dose, so that when a sufficiently large dose is given to produce pronounced paralysis, death generally follows in a few days. These findings are summarized in Table 9.

THE ACTION OF TRI-ORTHO CRESYL PHOSPHATE IN CALVES

In the preliminary communication on the cause of "ginger paralysis" (1) an experiment made on three calves was reported which served as the only piece of direct evidence to bring a phosphoric acid ester of one or more of the cresols into direct relationship with the recent epidemic of partial paralysis in man. At that time it appeared that the calf was the only animal to show a degree of susceptibility to this poison in every way comparable with that of man. Now that means have since been found of reproducing fairly accurately the human disease in more suitable laboratory animals the plan for conducting further experiments upon calves has been abandoned for obvious reasons. Two other experiments were made, however, which are of sufficient interest to record here, for they not only

confirm the first observations, but also corroborate in large measure all the other experiments reported herein.

The outcome of the experiment on the three calves reported previously (1) was as follows:

Calf No. 1, receiving the control ginger, remained normal for over 9 weeks.

Calf No. 2, receiving the same amount of paralytic ginger, and having developed typical mild paralysis of the posterior extremities within about 3 weeks, remained in apparently the same condition for about 5 weeks. It then began to improve rapidly and in a few days (by the 12th of August) it appeared practically normal.

Calf No. 3, receiving the adulterated U. S. P. fluid extract ginger containing 2.5 per cent technical tricresyl phosphate, resulting in paralysis like that of the preceding calf, remained paralyzed for about 3 weeks. The condition of this calf was getting worse, however, being complicated by a pronounced dyspnea, the cause of which has not yet been cleared up. It was then deemed advisable to sacrifice this animal and save the material for histopathologic studies.

The two surviving calves were subsequently used in another experiment with the following results:

Calf No. 1, was given, on August 6, by stomach tube, 200 mg. per kilo of C. P. tri-ortho cresyl phosphate dissolved in alcohol, the dose of the alcohol being 5 c. c. per kilo. A moderate degree of alcoholic intoxication followed from which the animal recovered the following day. For several days following, there was diarrhea, otherwise the animal appeared normal until the 24th. By the 31st it showed a well-developed "hoof drop" of the posterior extremities, with impaired gait and some ataxia. The animal tired easily and stumbled frequently on running. There was considerable dyspnea.

Calf No. 2, which had nearly, if not completely, recovered, was given, on August 12, an intramuscular injection of 200 mg. per kilo of technical tri-ortho cresyl phosphate. There were no symptoms of any description until the 24th, when there was just a barely detectable weakness of the hind legs. By the 31st there was definite and unmistakable weakness of the posterior extremities, with difficult and ataxic gait.

These two calf experiments, together with those previously reported, show that tri-ortho cresyl phosphate given orally or intramuscularly produces in the calf, after a long latent period, a paralysis of the extremities comparable in every detail with the human "ginger paralysis."

THE ACTION OF TRI-ORTHO CRESYL PHOSPHATE IN CHICKENS

Having become thoroughly convinced of the etiologic relationship of the ortho isomer of tricresyl phosphate to the recent epidemic of

so-called ginger paralysis it appeared desirable to extend the search further in the hope of finding a more suitable laboratory animal. The results of experiments upon albino rats have been indifferent so far. Observations upon chickens, however, have shown conclusively that in this species the symptoms as they appeared in man, as well as the entire course of the disease are reproducible with remarkable uniformity, as faithfully and as accurately as could be wished.[5]

Briefly stated, a series of 17 chickens (Plymouth Rocks) have been used in this work so far. The birds weighed from one to two kilograms, usually 1.5 kilos. Tri-ortho cresyl phosphate (technical) was administered by crop in suitable doses measured into number 0 gelatin capsules. The ester was diluted with alcohol when necessary. The following doses were given with the following results:

Group 1. Three birds. Each received 20 mg. of the ester per kilo. No definite leg lameness has become apparent so far (18 days).

Group 2. Three birds. Each received 50 mg. per kilo. Definite leg lameness in 8 to 15 days and partial leg paralysis in 18 days. Wings apparently unaffected.

Group 3. Three birds. Each received 200 mg. per kilo. Definite leg lameness in 11 days. Complete leg paralysis in 12 to 15 days.

Group 4. Three birds. Each received 400 mg. per kilo. Definite leg lameness in 6 to 9 days. Complete leg paralysis in 10 to 14 days. Pronounced wing disability.

Group 5. Three birds. Each received 1.0 gm. per kilo. Definite leg lameness in 8 days, complete leg and wing paralysis in 10 to 12 days.

Group 6. Two birds. One received 0.5 gm. and the other 1.0 gm. per kilo of tri-para cresyl phosphate. No effects whatever so far (40 days).

This experiment is in progress at the present writing, and it is not possible to discuss it in detail. The birds of group 4 have been under observation the longest. One of them was in a state of complete paralysis of the legs and partial paralysis of the wings, but otherwise in apparently good condition for 12 days, when it developed dyspnea and died shortly thereafter. The other two have been in a similar state of paralysis for 12 to 14 days. Both have considerable dyspnea.

It seems likely that the results will ultimately show that the lethal dose of tri-ortho cresyl phosphate in the chicken may be about one-half or one gram per kilo, while 50 mg. per kilo or even less may be sufficient to produce partial paralysis. What the lethal dose of the poison is

[5] While this work was in progress, a brief report appeared by Watkins (9) to the effect that leg lameness developed in chickens following the administration of ginger believed to have caused paralysis in man. Watkins also states briefly that ginger plus phenol has resulted in leg lameness in chickens. It is very doubtful that either ginger or phenol or the combination of the two could result in a type of leg lameness in chickens similar to the partial paralysis in man. All our work on chickens, which is still in progress, points to the phosphoric acid ester of ortho cresol as the specific etiologic factor, as in the other species investigated.

in man we do not know, for apparently there have not been any fatalities directly attributable to the drinking of adulterated ginger extract. From all the experiments reported herein it is not unlikely that the fatal dose in man may be in the neighborhood of one gram per kilo. Since on the basis of the present evidence this substance must have been contained in adulterated ginger in concentration of about 2 per cent, the average adult would have had to imbibe about 3,000 c. c. or more of some 80 per cent alcohol in a relatively short space of time to prove fatal. On the other hand, judging from the chicken experiments, as little as two grams of the poison and possibly less might have been sufficient to cause a moderate degree of paralysis in man. This would have required the consumption of 100 c. c. or less of the ginger extract. This fits in quite well with many apparently authentic histories of one 2-ounce bottle or even less of the ginger extract having caused paralysis in some of the cases (1).

DISCUSSION

The pharmacological evidence presented herein leaves no room for doubt that the phosphoric acid ester of ortho-cresol behaves differently from the manner in which the corresponding cresol or the other cresols behave, and that it is capable of producing specific paralysis of the motor nerves of the extremities in certain species of animals and under certain conditions more or less exactly the same as occurred recently in thousands of human victims, traceable to an adulterated fluid extract of ginger. Furthermore, evidence has been advanced to show that this remarkable specificity upon the motor nerves exhibited by the phosphoric acid ester of ortho-cresol is not shared by the similar esters of phenol or para cresol. It would be extremely hazardous to venture an opinion as to the behavior of the corresponding ester of meta-cresol which is being prepared for future investigation. The question also arises as to whether or not other phenolic esters might not also have their action modified or altered as to be essentially different from the phenols themselves. The problem of the action of phenol esters seems to have received but little attention in the past. Indeed the only piece of satisfactory pharmacological work on this problem is that of Greenwald (7), on meta-cresol acetate, and this shows quite conclusively that its behavior in the body is not different from that of the meta-cresol contained therein.

There are a number of questions that the unfortunate incident giving rise to this unusual find, fortuitous as it was, brings up for consideration. To the writer as pharmacologist, two points emphasize themselves especially: One is the relation of chemical constitution to pharmacologic action. Chapters have been written on this subject, but here is a new instance of a unique relationship of perhaps no known parallel, a relationship that probably no one could have

predicted, for it does not appear to follow any known rule or law. This incident therefore brings out forcibly the need of more new facts to enlarge our limited knowledge of the underlying principles that govern the relation of chemical structure to pharmacologic action.

Another matter that emphasizes itself especially is the desirability of a closer cooperation between the pharmacologist and the synthetic organic chemist. The present work, it is believed, is sufficiently convincing that the recent epidemic of partial paralysis, styled by one writer as "The 1930 Type of Multiple Neuritis" (8) was caused by the highly specific poison tri-ortho cresyl phosphate, the pharmacologic action of which was heretofore entirely unknown. The precise reason for including this remarkable substance as one of the ingredients of a substandard fluid extract of ginger made and sold for beverage purposes will probably never be known, unless a confession is wrung out of the guilty ones. It seems entirely reasonable, however, to suppose that it was included there on account of its physical or other properties which make it difficult to distinguish from the normal ginger constituents. Only a chemist of some ability could have thought of this; and had there been anything known about the pharmacologic action of this substance and the possible dire consequences, it is probable that it would never have been used and the disaster would never have happened. One may wonder whether there are not many other organic compounds of great pharmacologic interest, perhaps some with therapeutic possibilities, awaiting the attention of the pharmacologist.

FURTHER CHEMICAL STUDIES ON THE OCCURRENCE OF TRI-ORTHO CRESYL PHOSPHATE IN PARALYTIC GINGER

The chemical isolation of tri-ortho cresyl phosphate from an alcoholic ginger extract in a state of sufficient purity to enable one to identify it by its physical and chemical constants as distinguished from the other isomers has presented so far considerable technical difficulties. Some further chemical work has been done, however, the results of which fully harmonize with the pharmacological data already presented. Furthermore, pharmacological experiments with such material as has been isolated from the paralytic ginger leave no room for doubt that the fraction isolated is indeed to a large extent tri-ortho cresyl phosphate.

The chemical evidence concerned with the P_2O_5 determination in the paralytic ginger, indicating the equivalent of about two per cent of tri-cresyl phosphate has already been referred to.

The fraction behaving pharmacologically like tri-ortho cresyl phosphate was obtained from adulterated ginger (sample No. 1 of first report) by removal of the alcohol, separation of the supernatant liquid, and distillation of the residue at about 246° C. and 50 mm.

Hg. This fraction had the following properties as compared with those of C. P. tri-ortho cresyl phosphate, the latter as given by the manufacturers and partially confirmed by ourselves:

	Isolated fraction	C. P. Tri-ortho cresyl phosphate
Specific gravity	1.14	1.18.
Refraction index	1.545	1.555.
Boiling range	246° C.-275° C. (50 mm. Hg.).	263° C.-265° C. (20 mm. Hg.).
P_2O_5	13.8	19.0.

This fraction was found not to contain any free phenols and also that the phosphoric acid was apparently as firmly combined in this fraction as in tri-ortho cresyl phosphate. Although the Millon reagent applied to the distillate obtained upon saponfication with strong alkali, acidification, and steam distillation indicated the presence of at least one other phenol in this fraction besides ortho cresol, it gave Melzer's benzaldehyde test which, according to Autenrieth (10) is given only by ortho cresol and not by the other cresol isomers.

Pharmacologic examination of this fraction showed the following:

A. Rabbits.—Five rabbits receiving 0.125 c. c. per kilo, administered *per os* in the usual way in alcohol, survived. One, however, showed slight but definite symptoms of tri-ortho cresyl phosphate poisoning and another moderately severe symptoms.

Three rabbits receiving 0.200 c. c. per kilo exhibited typical symptoms of tri-ortho cresyl phosphate poisoning and died in from 2 to 5 days.

B. Monkeys.—Two monkeys receiving subcutaneously 1.0 and 2.0 c. c. per kilo, respectively, developed after an interval of 6 and 8 days typical motor paralysis of the lower extremities, the one mild, and the other moderately severe.

C. Chickens.—Three chickens each receiving orally 0.5 c. c. per kilo of this fraction all developed distinct leg lameness in from 8 to 9 days and pronounced paralysis of the legs in from 10 to 12 days.

These experiments prove conclusively that the fraction isolated from the suspected ginger contained some 50 per cent or over of tri-ortho cresyl phosphate. What else it may have contained can not be stated, nor is it pertinent.

SUMMARY

A pharmacologic study of the action of the phosphoric acid esters of phenol and some of the cresols has shown conclusively that tri-ortho cresyl phosphate, and in so far as the present evidence goes, it alone, can produce in experimental animals a specific type of motor

paralysis of the extremities in every sense comparable with that which occurred recently in human victims who drank of an adulterated fluid extract of Jamaica ginger.

Some of the differences in species susceptibility to tri-ortho cresyl phosphate previously reported appear now to be due to differences in its absorbability from the alimentary canal. Certain other differences in species susceptibility can not yet be accounted for on the basis of our present limited knowledge of the manner of action of this poison in the animal body.

Pharmacologic evidence has been presented to show conclusively that the adulterated fluid extract of Jamaica ginger used for beverage purposes, resulting in an epidemic of partial paralysis, contained tri-ortho cresyl phosphate to the extent of about 2 per cent. The chemical evidence we have secured confirms the pharmacologic evidence and fully harmonizes with it.

The etiologic relationship of tri-ortho cresyl phosphate to the recent epidemic of so-called ginger paralysis is thus definitely established.

It is a pleasure to acknowledge the cooperation of the Bureau of Animal Industry, Department of Agriculture, in making it possible to carry out the calf experiments.

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TABLE 1.—*Action of phenol in rabbits administered daily in 80 per cent alcohol per os*

No.	Weight, kilos	Dose				Result[1]
		C. c. per kilo	Solution, per cent	Number of doses	Total grams per kilo	
67	2.5	6	2	13	1.560	S
68	1.6	6	2	12	1.440	S
69	2.0	5	2	14	1.400	D (coccidiosis)
61	4.0	5	10	1	0.500	D (acute phenol poisoning)
62	2.9	5	10	4	2.000	D
63	2.1	5	10	2	1.000	D (acute phenol poisoning)

[1] S=survived 2 weeks or more after treatment had been discontinued; D=died

TABLE 2.—*Action of triphenyl phosphate (technical) in rabbits administered daily in 80 per cent alcohol per os*

No.	Weight, kilos	Dose				Result [1]
		C. c. per kilo	Solution, per cent	Number of doses	Total grams per kilo	
43	2.6	6	2	6	0.720	S
44	2.0	8	2	9	1.440	S
45	2.3	8	2	9	1.440	S
108	2.0	5	5	5	1.250	D
109	1.8	5	5	3	0.750	D
110	1.8	5	5	5	1.250	D

[1] S=survived 2 weeks or more after treatment had been administered; D=died.

TABLE 3.—*Action of tricresol in rabbits administered daily in 80 per cent alcohol per os*

No.	Weight, kilos	Dose				Result [1]
		C. c. per kilo	Solution, per cent	Number of doses	Total grams per kilo	
164	2.0	5	2.5	10	1.250	S
165	2.1	5	2.5	10	1.250	S
166	2.1	5	2.5	10	1.250	S
167	2.5	5	2.5	3	0.375	D
168	2.3	5	5.0	7	1.750	S
169	2.1	5	5.0	6	1.500	D
170	3.5	5	5.0	7	1.750	D
171	3.0	5	5.0	6	1.500	S

[1] S=Survived 2 weeks or more after treatment had been administered; D=died.

TABLE 4.—*Action of ortho cresol in rabbits administered daily in 80 per cent alcohol per os*

No.	Weight, kilos	Dose				Result [1]
		C. c. per kilo	Solution, per cent	Number of doses	Total grams per kilo	
156	2.3	5	2.5	8	1.000	S
157	2.0	5	2.5	4	0.500	D
158	2.7	[illegible]	2.5	8	1.000	D
159	2.3	5	2.5	3	0.375	D
176	1.9	5	2.5	9	1.125	S
160	2.3	5	5.0	6	1.500	D
161	2.2	5	5.0	3	0.750	D
162	2.5	5	5.0	2	0.500	D
163	2.2	5	5.0	6	1.500	S
177	2.3	5	5.0	6	1.500	S
178	1.6	5	5.0	6	1.500	S

[1] S=Survived 2 weeks or more after treatment had been administered; D=died.

TABLE 5.—*Toxicity of C. P. tri-ortho cresyl phosphate in rabbits, 2.5 per cent solution in 80 per cent alcohol per os*

No.	Weight, kilos	Dose per kilo		Result
		C. c.	Mg.	
185	2.9	6	150	Died within 24 hours.
188	2.5	6	150	Died in 2 days.
183	1.9	6	150	Died in 2 days.
189	2.5	6	150	Died in 4 days.
184	1.9	6	150	Died in 6 days.
192	1.9	4	100	Died in 2 days.
190	2.3	4	100	Died in 3 days.
193	2.3	4	100	Died in 3 days.
174	2.2	4	100	Moderately severe symptoms—survived.
175	2.1	4	100	Moderately severe symptoms—survived.
148	2.0	3	75	Moderately severe symptoms—survived.
149	1.5	3	75	Moderately severe symptoms—survived.
150	3.0	3	75	Moderately severe symptoms—survived.
195	2.1	3	75	Died in 4 days.
199	2.0	2	50	Died in 9 days.
197	2.2	2	50	Definite symptoms for 4 days followed by recovery.
198	2.1	2	50	No effects—survived.
200	2.6	2	50	Symptoms 4 days after administration lasting 10 days.

TABLE 6.—*Toxicity of C. P. tri-para cresyl phosphate in rabbits, 10 per cent solution in 95 per cent alcohol per os*

No.	Weight, kilos	Dose per kilo		Result [1]
		C. c.	Mg.	
201	2.6	5	500	S
202	2.1	5	500	S
203	2.3	5	500	S
204	2.5	5	500	S
205	2.3	7	700	S
206	2.0	7	700	S
207	2.0	7	700	D

[1] S=survived; D=died.

TABLE 7.—*Action of C. P. tri-para cresyl phosphate in rabbits administered daily in 95 per cent alcohol per os*

No.	Weight, kilos	Dose				Result [1]
		C. c. per kilo	Solution, per cent	Number of doses	Total grams per kilo	
141	2.0	4	2.5	11	1.100	D
142	1.9	4	2.5	14	1.400	D
144	2.0	4	2.5	13	1.300	D
151	2.6	4	2.5	10	1.000	S
152	2.2	4	5.0	8	1.600	S
153	1.6	4	5.0	5	1.000	D
154	1.9	4	5.0	8	1.600	S
179	1.8	5	5.0	4	1.000	D

[1] S=survived; D=died.

TABLE 8.—*Action of tri-ortho cresyl phosphate in monkeys (subcutaneous injections)*

No.	Weight, kilos	Dose injected, c. c. per kilo	Grade	Interval before onset of paralysis, days	Duration of motor paralysis, days	Result
11C	3.3	0.05	T.			No effects.
4D	3.5	.20	T.			Do.
22A	4.0	.50	T.			Do.
23A	2.7	.50	C. P.	4	3	Paralysis severe. Died.
4D1	3.5	1.00	T.	6	11	Do.
11C1	3.3	1.00	T.	6	2	Do.
17A	3.7	1.00	T.	8	2	Do.
22A1	4.0	1.00	T.	7	6	Paralysis severe—sick. Killed.
15B	3.3	1.00	T.	8	15	Paralysis moderate—improving.
16B	3.8	1.00	C. P.	4	16	Paralysis moderate—recovered.
12D	3.3	1.00	C. P.	8	8	Paralysis moderate—progressing.
2C	3.0	.50	C. P.			No effect.
1C	4.6	1.00	C. P.	7	40	Paralysis severe. Died.

TABLE 9.—*Action of tri-ortho cresyl phosphate in dogs*

No.	Weight, kilos	Dose c. c. per kilo	Grade	Route	Result
14	10.9	0.40	C. P.	Os	No effects in 40 days.
15	10.9	1.00	C. P.	Os	Do.
16	10.9	3.50	T.	Os	No effects in 30-50 days.
17	11.0	4.00	T.	Os	No effects in 30-50 days.
6	10.5	.20	T.	Subcutaneous.	No effect.
11	4.5	.20	C. P.	do	Do.
8	12.7	.40	T	do	Generalized spastic paralysis in 7 days, followed by death on the eighth day.
7	12.8	.50	T.	do	9 days after injection there was weakness of anterior and posterior extremities, lasting 13 days. Died.
5	10.5	.50	T.	do	Very slight weakness of posterior extremities 3 weeks after injection, lasting 16 days. Recovered.
9	7.3	.60	C. P.	do	No effect in 23 days.
12	7.3	1.40	T.	do	Flaccid paralysis of anterior and posterior extremities in 7 days. Paralyzed 8 days. Died.
13	9.1	1.60	T.	do	Paralysis as above in 8 days. Paralyzed 2 days. Died.
6	10.5	1.00	T.	do	Weakness of posterior extremities with some incoordination 18 days after injection. Paralyzed 30 days. Died.

UNDULANT FEVER

With Special Reference to a Study of Brucella Infection in Iowa

By A. V. HARDY, *Acting Assistant Surgeon, United States Public Health Service; Associate Professor of Preventive Medicine, University of Iowa College of Medicine; and Director of the Laboratories of the Iowa State Department of Health;* C. F. JORDAN, *Acting Assistant Surgeon, United States Public Health Service,* and *Assistant Professor of Preventive Medicine, University of Iowa College of Medicine;* I. H. BORTS, M. D., *Chief Bacteriologist of the Laboratories of the Iowa State Department of Health;* and GRACE CAMPBELL HARDY, M. B. (Toronto), *Research Associate, Department of Preventive Medicine of the State University of Iowa*

(The first part of this article, dealing with the history, etiology, and epidemiology of undulant fever, was published in PUBLIC HEALTH REPORTS for October 10, 1930 [1])

VI. CLINICAL INFORMATION

GENERAL

Marston (2), in his essay on fevers, pointed to the outstanding characteristic of this infection in these words: "There is no fever so irregular as this in its course and symptoms." Hughes (1), who has given us an excellent clinical description of undulant fever, introduces his chapter on symptomatology as follows: "So variable are the symptoms and so uncertain is the duration and course of this fever, that it is impossible to give a description to which all cases can be referred." Craig (10) reiterated the same thought when he said: "It is extremely difficult to describe accurately all the forms which this truly protean disease may assume." A simple clinical description of the commonest type of case would, therefore, be misleading. We shall here present descriptions of the four accepted clinical types of this disease, followed by a clinical analysis of the cases studied in Iowa, supplemented by data taken from the studies of Simpson (63), Kern (80), and others. The description here given will be restricted to that of undulant fever due to *Br. melitensis* var. *abortus* and *suis;* but, in conclusion, the characteristics of this infection will be compared with that of undulant fever of caprine origin.

CLINICAL TYPES

Undulant fever was first classified by Hughes (1). On the basis of differences in temperature curves, he described three types—the malignant, the undulatory, and the intermittent. He also recognized an ambulatory form and mentioned the irregular and mixed varieties. These same types have been observed in cases of infection with the more recently discovered varieties of *Br. melitensis,* although not well defined. Still the acceptance of this classification does facilitate an adequate clinical description.

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[1] The complete article will be issued later as National Institute of Health Bulletin, No. 158.

Intermittent type.—Most of the Iowa cases of human infection with *Brucella* were of this type. The onset was insidious, a sense of progressing afternoon weariness first oppressing the patient. General aching, some headache, a distaste for food, spells of chilliness in the early evening, and moderate insomnia followed in turn, and sometimes a suspicion of fever. Backache, stiffness or pain in the neck and joints, constipation, and loss of weight were added to the accumulating signs and symptoms. There was, in some cases, a hacking cough which was occasionally persistent. Later, night sweats occurred, frequently drenching in character. Repeated rigors were sometimes distressing. It was usually a matter of weeks before these patients sought medical advice, most often in an office consultation. These patients often found difficulty in defining their ailments; or, perhaps, one of the above mentioned symptoms was the chief complaint. Physical examination usually revealed no abnormalities except the signs of anemia, weakness, and loss of weight, although sometimes the spleen was palpable or the abdomen tender. The patients usually felt much better when confined to bed either by the physician's advice, or their own disabilities. With mild infections they might be up in the morning, but glad to rest in the afternoon. The most persistent symptoms were anorexia and weakness, or weakness alone. These symptoms, plus the fever, were in some cases the only manifestations of disease. The severity of these cases varied, so that while some were confined for only a few days, others suffered a prolonged infection which terminated fatally. Most of the infections lasted between six weeks and four months, with about one-third of this period spent in bed. Morning temperatures were found between normal and 100° and evening temperatures between 101° and 104°. A few complete records revealed superimposed undulatory waves. The fever terminated by a slow lysis, but early in convalescence it readily recurred following overexertion (fig. 22). Cases 1B and 2B, reported in Appendix B, illustrate this type.

The ambulatory type.—In our series an average of 25 per cent of the cases were ambulatory. Simpson reported that one-fourth of his cases experienced a relatively short and mild illness, 12 per cent remaining at work throughout. The onset in these cases was quite insidious, the one constant symptom and occasionally the only one, being weakness or lack of endurance. All the symptoms already noted in the intermittent form occurred in some cases, though mild in degree. Physical examination usually revealed no abnormality. The spleen was palpable in a few patients. The temperature, normal in the forenoon, rarely reached 101° in the evening. The duration varied from two weeks to several months, but often it was more than one month and less than four. We have here a gradation from

the mild intermittent form to subclinical infection. Illustrative cases are No. 3B and 4B, Appendix B.

Undulatory type.—The distinguishing characteristic of these cases was the occurrence of relapses. When intervening short periods of apyrexia occurred, the temperature records had a wave-like appearance. This feature was a frequent occurrence in the Mediterranean cases, but has only occasionally been met with in cases of infection with the *abortus* or *suis* variety. Fifteen per cent of our cases, and also of Simpson's Ohio cases, suffered relapses; but even in these, typical undulations were rarely observed. Because the onset of these cases was accompanied by complaints of weakness, general aching, headache, and anorexia, it often suggested to the patient and his physician the presence of influenza or the so-called "intestinal flu" or "summer flu." Scarcely recovered from the first attack, a second supervened in which the early symptoms were aggravated and to which were added headache, constipation, and insomnia. Night sweats sometimes occurred from the first, but often were not noted until later. Characteristically, the temperature increased day by day, in a step-like manner, until the maximum was reached. Morning remissions were not marked, and after a variable period the temperature decreased by a gradual lysis. Occasionally such a train of events was repeated several times in the same patient. In other cases, however, the disease began as the usual intermittent type and was followed, at variable intervals, by one, two, or more relapses. These usually decreased progressively in intensity and duration. We have observed that our cases of the undulatory type equalled in severity the milder and *moderately severe* intermittent forms. Without carefully following these cases, one can not state with certainty their actual duration, but we have not observed an undue prolongation of symptoms. Temperature curves are shown in Figure 22 and selected cases reported in Appendix B (cases 5 B and 6 B).

The malignant type.—Infections of this nature due to *abortus* or *suis* varieties of *Br. melitensis* were rare, comprising less than 1 per cent of the Iowa cases. They were characterized by sudden onset, an acute course, and usually a fatal termination. The temperature was high and sustained, with an extreme hyperpyrexia occurring before death. There were great prostration, severe headache and backache, marked anorexia, and usually true rigors, and constipation. Sooner or later delirium and coma appeared. Profuse perspiration seemed to be lacking. The spleen was much enlarged. The duration of both of our cases of this type was about three weeks. These cases are described in the Appendix (Nos. 7 B and 6 D).

ATYPICAL CASES

In the diagnosis of undulant fever, due consideration must be given to the occurrence of atypical forms. These infections may closely simulate other diseases, and an accurate diagnosis is then dependent upon laboratory findings. Atypical cases, selected from our series, are presented in Appendix C. A study of these case histories will reveal that undulant fever may present the clinical manifestations of typhoid fever, tuberculosis, broncho-pneumonia, meningitis, cystitis, "rheumatism," and various surgical conditions. This infection may simulate other disease entities, especially during the period of onset, as is illustrated by case 7 C, in which the complicating "orchitis" of undulant fever was first considered to be a gonorrheal epididymitis. Another case was particularly well disguised. A farmer had injured his right foot, but the wound healed after local treatment. Twelve days later, however, he returned to his physician complaining of a "stiffness" of his limbs, chiefly the right leg. Because of difficulty in accounting for these symptoms on any other basis, they were regarded as the earliest indication of tetanus. Antitoxin was given, but undulant fever developed, and during the course manifested the usual symptoms and signs.

In cases such as these, errors in diagnosis are excusable, perhaps unavoidable. It may, however, be observed that these errors often resulted from considering only the immediate complaint and some local condition. A full history and a complete physical examination made by an examiner having an accurate knowledge of undulant fever in all its forms, and aided by the available laboratory tests, would, we believe, give early and accurate diagnoses in a large majority of the cases of this disease.

FATAL CASES

At the present time data are inadequate for any description of the morbid anatomy of infections with the *abortus* or *suis* varieties. This can be determined only from an accumulation of the information contained in the reports of fatal cases, and of necropsies. For these reasons, we detail, in Appendix D, the symptoms, signs, and course of the 10 fatal cases in Iowa, and the necropsy findings in two cases. The following observations on this group are presented:

In five cases death occurred without clinical evidence, in one case without pathological evidence, of any complication or localized infection; there was involvement of the cardiovascular system in three instances, revealing evidence of malignant endocarditis in two of these; in one a lung abscess occurred; in another the gastrointestinal system was mainly involved. The etiological relationship of *Brucella* to the production of these fatal complications was uncertain. It is

to be noted that some cases which began as the intermittent or ambulatory type terminated fatally as well as those which, from the first, were malignant in nature.

In addition, two other fatalities occurred which may possibly be attributed to *Brucella* infection. One patient, with a past rheumatic history and a well compensated mitral lesion, developed an auricular fibrillation early in his attack of undulant fever. Throughout his illness cardiac symptoms were prominent, and following subsidence of fever he failed to gain and died a few months later. The second case was that of a farmer who had prolonged clinical manifestations of undulant fever, but whose serum agglutination was not above 1:40 dilution. Cultures were not taken. At his death the attending physician performed a necropsy, but failed to find gross lesions which could account for the death. The tissues were not saved for section.

In the literature there are few reports of fatal cases of *Br. melitensis* infection, variety *abortus*. Baastrup (81) describes a 6-month illness in a gardener of 48 years. The immediate cause of death was uremia, and this was attributed to an acute nephritis caused by *Brucella*. Such a complication is most unusual and the possibility of the nephritis having an unrelated etiology must be recognized. Scott and Saphir (82) recently report the isolation of *Br. melitensis* var. *abortus* from the blood stream of a patient whose illness of nine months was terminated by endocarditis with embolic phenomena. *Brucella* was also isolated from blood obtained at necropsy, and at no time was any other organism cultured. The clinical history was that of a prolonged undulant fever, with at least one afebrile period of undetermined length. A leucocytosis was found, but only one count was reported. Clinically there was a mitral stenosis which was accounted for by a clear history of acute rheumatic fever. On both the mitral and aortic valves friable, grayish, or yellowish gray vegetations were found. The spleen was markedly enlarged. The authors are very guarded in their conclusions. Still we believe that the terminal illness in this case may be largely explained as a *Brucella* infection. Kristensen (60) mentions 7 fatalities among 216 patients, but only 2 of these had been healthy immediately preceding the onset of undulant fever. Two other fatal cases have been reported by Duffie (83), but the epidemiological, clinical, and laboratory data do not justify their acceptance as *Brucella* infections.

A CLINICAL ANALYSIS

Undulant fever is a generalized infection. Occasionally definite evidence of localization appears, though variable in location, so that all symptoms and signs must be included in a complete consideration of the disease. Three hundred of the Iowa cases provide adequate data for a detailed study. An analysis of these cases in toto has served

to verify in a large measure the findings on 125 cases previously reported (99). Any significant differences in the two groups will be noted here. A composite presentation of the information contained in Simpson's (63) report on 90 cases, the observations of Kern (80), the data in numerous case reports in the literature, and our own study, ought to provide an adequate conception of infection due to the *abortus* and *suis* varieties of *Br. melitensis.*

INCUBATION PERIOD

An accurate determination of the incubation period was difficult in the majority of cases, because exposures were usually multiple and the exact day of onset could rarely be named. In human infections, experimentally produced with *Br. melitensis* var. *suis*, Otero (66) reported that the incubation period of one was at least 17 days, and may have been 34 (two exposures were given 17 days apart). The second infection arose after five daily exposures, with suggestive symptoms at 7 days, and definite symptoms at 10 days after the last dose. The incubation period in these cases was apparently between 10 and 15 days. In a recent personal communication from this author he stated that in six cases, infected through the abraded skin, the periods of incubation were from 10 to 16 days. In one of our cases, a packing-house employee, the disease followed a severe laceration of the arm. The wound was produced by the knife used in freeing the rectum in a freshly killed hog. Eighteen days later his first symptoms appeared, although it was four weeks before he consulted his physician. In such cases a heavier inoculation than usually occurs may be assumed. The data obtained through the experimental infection of monkeys is scarcely comparable, though Huddleson has shown, by the demonstration of agglutinins, that infection was well established in from 10 to 15 days following exposure. Our impression is that in human beings, naturally infected, the incubation period varies from 10 days to 3 weeks.

ONSET

The onset of undulant fever may be sudden or insidious. The physician may be called a few hours after appearance of acute symptoms (see case 70), or as in suspected tuberculosis cases, medical consultation may be sought after weeks of mild disability (case 2 C). The intervals from the appearance of first symptoms to the medical consultation, or to the time when the patient became bedfast, we have designated in our case records as the period of onset. Among 230 cases the onset duration in 27 cases (12 per cent) was less than one week, and one-half of these were ushered in abruptly. In 38 cases (17 per cent) it was one week; in 55 cases (24 per cent) ten days to two weeks; in 61 cases (26 per cent) three weeks to two months; in

19 cases (8 per cent) six weeks; in 30 cases (13 per cent) two months or longer.

During this period the symptomatology was highly varied. In some cases clinical symptoms of an acute respiratory infection, including sinusitis, preceded the prolonged illness, and in some cystitis or pyelitis apparently first gave concern. Whether or not these local infections during the invasion were specific has not been determined. An acute onset following operative procedure has been noted by Kern (80). He further mentioned the case of Warren, Smith, and Linder, in which a sudden onset of illness followed a dose of typhoid vaccine. One of our cases was similar in nature. The patient suffered from chronic appendicitis and came into the hospital for operation with no immediate complaint. A slight elevation of temperature was manifest on the evening of admission, and after her operation the following day an acute febrile condition developed, which proved to be a *Brucella* infection. With these cases it seemed probable that a very mild subclinical or a dormant infection had been provoked into acuteness by conditions which lowered the resistance.

With the exception of two cases which began abruptly with rigors, all cases with rapid or with insidious onset were initiated by similar symptoms though differing markedly in intensity. Varying degrees of lassitude, weakness, lack of energy, or easy tiring were the initial symptoms in slightly more than one-half of our patients. Headaches gave the first indication of illness in 10 per cent while in others spells of chilliness, anorexia, and general aching were noticed. Hence the patient sometimes stated that his illness began with an attack of "la grippe," "flu," or "intestinal flu." Infrequently the first symptoms were night sweats, backache, stiffness of the neck or joints, arthralgia, abdominal pain, drowsiness, and dizziness.

On visiting a physician, the patients' complaints included the above symptoms, but most frequently they sought medical advice because of suspicion of the occurrence of fever. Less frequently, general or localized aches, abdominal pain, loss of weight, painful micturition, insomnia, cough, constipation, or dizziness, either singly or variously combined, were the complaints emphasized. Others, though rare, were those related to the complications of undulant fever.

SYMPTOMS

The common symptoms and signs and their relative frequence are shown in Figure 21. The occurrence of severe symptoms and prominent physical findings are also indicated. These tabulations were prepared from our own clinical record forms where not only the fact of their presence or absence, but the degree of severity, the time of occurrence, and other characteristics of the symptoms were briefly

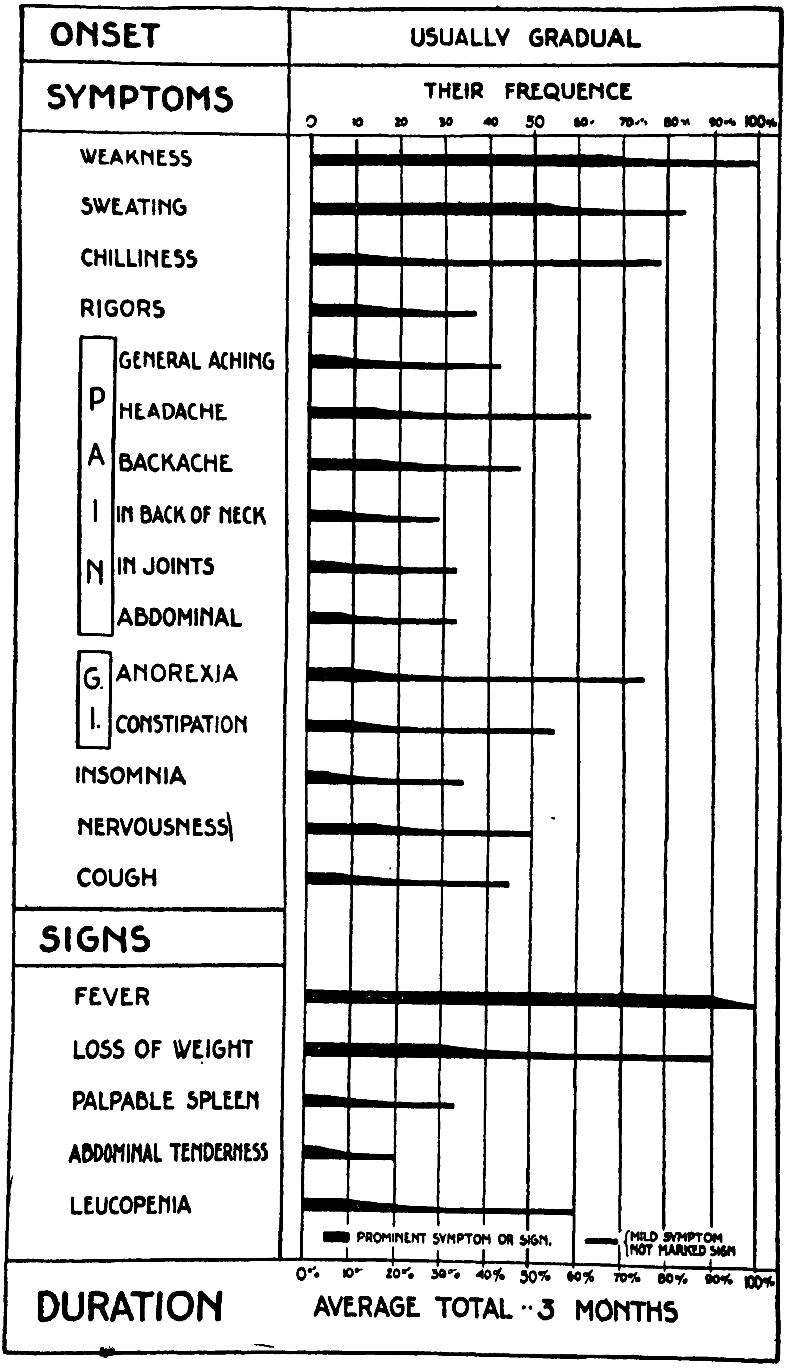

FIGURE 21.—Common clinical characteristics of *Br. melitensis* var. *abortus* and *suis* infections. (Data from which this chart was prepared were obtained by an analysis of the Iowa cases.)

noted at the time of taking the history. The following observations have been made concerning these symptoms:

Weakness.—This was the one symptom assuredly present in all cases, although in mild infections it was often experienced only in the afternoon. Occasionally it constituted the only subjective manifestation of the disease. During the period of onset it was the most common symptom; during the fastigium in two-thirds of the cases, the most prominent or severe; and during convalescence, the most persistent.

Sweating.—The most distinctive feature of the disease was the sweating, which occurred in 84 per cent of our cases. Such patients experienced marked remissions of temperature and included most of those whose temperature curves were of the intermittent form. The very mild cases with a low-grade fever, and the malignant ones with a high and sustained temperature, were those which experienced no sweating.

In 53 per cent of our cases, as in Simpson's, the sweating was profuse or moderately so. It usually occurred soon after midnight, and was of short duration. The patient ordinarily awakened bathed in perspiration, but again rested comfortably after a change of linen. The diaphoresis was sometimes, however, quite prolonged, necessitating several changes during a single night, or it occurred irregularly whenever the patient slept, even in the forenoon. This symptom still appeared at night in two ambulatory cases, who worked during night hours.

When true rigors did occur, sweating followed; but the rigor was not constantly related to any other symptom. Occasionally the nurse, attendant, or patient reported a very disagreeable odor associated with the perspiration. Sometimes a regional sweating was reported, but usually the diaphoresis was general.

Chills.—Chilliness was a symptom of the period of invasion and usually occurred in association with the daily rise of temperature. Although experienced by 77 per cent of the cases, it usually gave little discomfort. A farmer, for instance, counteracted it by wearing a heavy sweater, even though others were complaining of the summer heat. An afflicted physician wore his topcoat, even in the warm operating room while giving an anesthetic. Relief was thus sought and ordinarily obtained by additional covers or external heat. Once the patients became bedfast the symptom usually disappeared.

True rigors were a feature of more than one-third of our cases, though in but 12 per cent did more than two occur. When these appeared early they frequently led to a diagnosis of pneumonia and when they developed during the course, if regularly recurring, they suggested malaria. In an occasional case there was more than one in the 24 hours, one patient reporting two a day for several days in

succession, and another stating that on one day he had five. In the mild infections rigors were not noted; in the severe cases they were common.

Only in patients who also experienced spells of chilliness did the true rigors occur, and occasionally from history alone it was not clear whether the patients had only severe chilliness or a true rigor.

Pain.—In many cases the physician was much impressed by his patient's almost complete freedom from pain. In the morning there was usually no complaint, and, if bedfast, the patient was generally ready to talk and joke. Yet in the case of an infection so disseminated, one can not be surprised that aches and pains do occur in association with almost every system.

General aching was complained of in less than one-half of the cases, but was a prominent symptom in but 5 per cent. In ambulatory patients it often persisted throughout the disease and was aggravated by exercise, but in patients who became bedfast it usually disappeared rapidly. Some individuals described this aching as resembling the muscular soreness which follows overexercise; some likened it to the effects of a generalized trauma, while others said it was "just like the flu."

Headache, a common initial symptom, was ordinarily confined to the early stages of the disease. It was associated with the fever, hence appeared in the afternoon and was most severe in the evening; at times it was accompanied by pain in the eyes. Usually it was bilateral and frontal, rarely occipital.

Early in the disease a mild pain in the lumbar region was often induced or aggravated by exercise. Sometimes it became quite persistent and difficult to control and in 15 per cent of our cases it became a prominent symptom. In 29 per cent, pain in the back of the neck occurred, and was severe in one-quarter of these cases. A "stiff neck" (a mucular soreness with the pain aggravated by motion) was occasionally the first symptom of the disease. Rarely this was so intense as to lead to a suspicion of meningitis (case 4 C).

In both Simpson's and our own series, arthralgia, frequently described as "stiffness," occurred in one-third of the patients, either during the height of the disease process or in convalescence. This was usually very mild—sometimes almost indistinguishable from the general aching. Several of the large joints were usually involved and the associated pain has been "shifting" in character. A hydrarthrosis occurred in only one case.

Abdominal pain was the chief complaint in 15 per cent of Simpson's series. In 7 per cent of the Iowa series it was definite and severe, sometimes continuous and sometimes "cramplike." When mild, it has blended with the general aching, particularly since the localization was inconstant, appearing in some in the epigastrium, in some in

the right lower quadrant, or in almost any region. This symptom must be particularly borne in mind as it has led to erroneous diagnoses and needless, even harmful, surgical procedures.

Gastrointestinal symptoms.—Profound anorexia occurred in severe cases, but this symptom was entirely absent in the mild cases. It was found in three-fourths of our patients and in one-half of Simpson's. It has varied with the degree of fever, so that patients have enjoyed a good breakfast and luncheon yet had no appetite for an evening meal. When normal appetite returned, even though the fever still continued, one could prophesy an early recovery.

Nausea and vomiting occurred in some of the moderately severe infections, but even in such cases were not persistent. Nausea alone was present in 8 per cent and present in association with vomiting in 13 per cent.

Constipation was manifest in one-half to two-thirds of the cases and its degree paralleled the gravity of the infection. A specific diarrhea rarely, if ever, occurred.

Respiratory symptoms.—We have stated above that acute upper respiratory symptoms occurred at the onset of the disease. There was little to suggest that these symptoms were due to specific infection, although possibly pulmonary involvement was. We have gradually become aware of the frequency of a hacking, nonproductive cough. Rarely was it particularly troublesome, and in our earlier cases was attributed to unrelated pharyngeal irritation. More careful records in our later series of 175 cases indicate that more than one-third of the patients had a cough, some with mucoid or muco-purulent sputum. Here we may make mention of two cases diagnosed by consultants as broncho-pneumonia, of one case diagnosed as miliary tuberculosis, and of another in which a pulmonary abscess developed at the end of an infection in which the respiratory symptoms had been prominent throughout. (See Appendix, cases 2 C, 3 C, and 4 D.) In infected guinea pigs definite areas of broncho-pneumonia often occur, and we believe a similar pathological process may be found in man. *Br. melitensis* var. *abortus* has been cultured from tonsils (84) and *Br. melitensis* var. *melitensis* from the sputum (85)—findings which demand careful study of all respiratory symptoms and lesions in these infections.

Neurological symptoms.—Insomnia of varying degree was experienced by 50 per cent of our patients during the height of the disease. A hypersensitive state of the nervous system was manifest by marked restlessness, irritability, or by undue apprehension. Delirium and coma supervened only in very grave infections. Pains, which may be dependent on actual damage to the nervous system, have already been mentioned.

Genitourinary symptoms.—A few patients in our series were first treated as cases of cystitis or pyelitis. Mild symptoms of a localized infection, such as burning, pain on micturition, or frequency, though transient in nature, have occurred in 11 per cent. Difficulty in urination or retention rarely occurred. There was in some cases a definite decrease in urinary output, due presumably to the excessive perspiration.

Cardiovascular symptoms.—Palpitation and the symptoms of an irritable heart have occurred during the course of the disease. These same symptoms, through their long continuance, were in a few instances notable sequelae. Dizziness was at times a complaint early in the course or during the height of the disease. Other cardiovascular symptoms were related to the complications.

Loss of weight.—A progressive loss of weight usually occurred. Emaciation was marked in the severe infections and in those of a prolonged, though mild, nature. Farmers, for instance, who continued to work throughout a two to four months' period of illness, became very much wasted. Bed rest and adequate diet, both in severe and mild infections, largely prevented this. Among our patients who lost 20 pounds or more, one-third were ambulatory and one-third spent more than four weeks in bed. Among those who lost none or less than 10 pounds, one-third were ambulatory and one-third spent four weeks or more in bed. In 10 per cent of the cases there was no apparent loss of weight.

PHYSICAL OBSERVATIONS

Our study of the signs of undulant fever has been somewhat unsatisfactory. Usually we saw the patients once only, and often this was during convalescence. Although they recalled vividly their own symptoms, they knew little or nothing of the associated signs. Practitioners have generously placed at our disposal their observations, but owing to the many and urgent calls of practice, these were often made hurriedly and seldom recorded. Our later data have, however, confirmed the observations already reported, and the findings in Simpson's series and Kern's collected cases are in general agreement. We believe, therefore, that we have a fairly accurate knowledge of the physical findings of infection due to the *abortus* and *suis* varieties.

Signs detected by physical examination.—There was a great variation in the general appearance of those ill with undulant fever. A majority of the patients seen in bed did not appear sick. They were fairly comfortable, mentally alert, and ready to talk. Pallor was frequently noted, and the patients often appeared quite tired. In contrast to these usual cases, however, some patients were obviously

extremely ill, but even these were usually mentally clear and lacked the dullness so characteristic of typhoid fever.

The examination of the head rarely revealed anything significant. The tongue was usually somewhat coated, and a moderate congestion of the throat was not uncommon. About 10 per cent of our cases had the moist and dry rales indicative of bronchitis, while in two of the severe infections with recovery the findings justified the tentative diagnosis of broncho-pneumonia. In uncomplicated infections any abnormality in the cardiovascular system was unusual. A low blood pressure, rarely of marked degree, has been found late in the disease.

Abdominal tenderness was commonly encountered (20 per cent of our cases) and was usually associated with abdominal pain. Occasionally the tenderness was diffuse, but frequently localized in the right upper or lower quadrant, less frequently in the left upper quadrant. The spleen was palpable in one-third of the cases; marked enlargment was rare. It was quite firm and sometimes seemed tender. Occasionally the liver was definitely enlarged.

A skin eruption occurred in 11 per cent of Simpson's cases, and in the same proportion of Kern's series. A general eruption has been noted in only one of the Iowa cases, but physicians have frequently mentioned the observation of scattered maculae which somewhat simulated rose spots.

A localized hyperesthesia has been reported by a few patients which has been found on examination. The lumbar and calf muscles were occasionally quite tender.

The other physical findings which have been noted were those associated with the complications. These, and the findings related to them, will be described later. There has not been found, therefore, any characteristic physical sign of undulant fever. Indeed, an outstanding feature of the disease has been the absence of physical abnormalities. Our question concerning the findings on physical examination usually called forth from the attending physician the answer "I found absolutely nothing." Probably no one thing should so influence a physician to consider *Brucella* infection in differential diagnosis as a fever unexplained by positive physical signs.

Temperature.—Representative curves illustrating the types of temperature in the different varieties of undulant fever are shown in Figure 22. For comparison a curve regarded by Hughes (1) as typical of undulant fever of the Mediterranean region is also included. In infection due to *abortus* and *suis* varieties of *Br. melitensis* such a fever must be very unusual, since as yet we have not encountered a single chart which conformed closely to the type so frequently described. A few of our cases have shown definite undulations with periods of apyrexia, though all have had a rather low-grade fever. Complete temperature records have been available on only a small number of

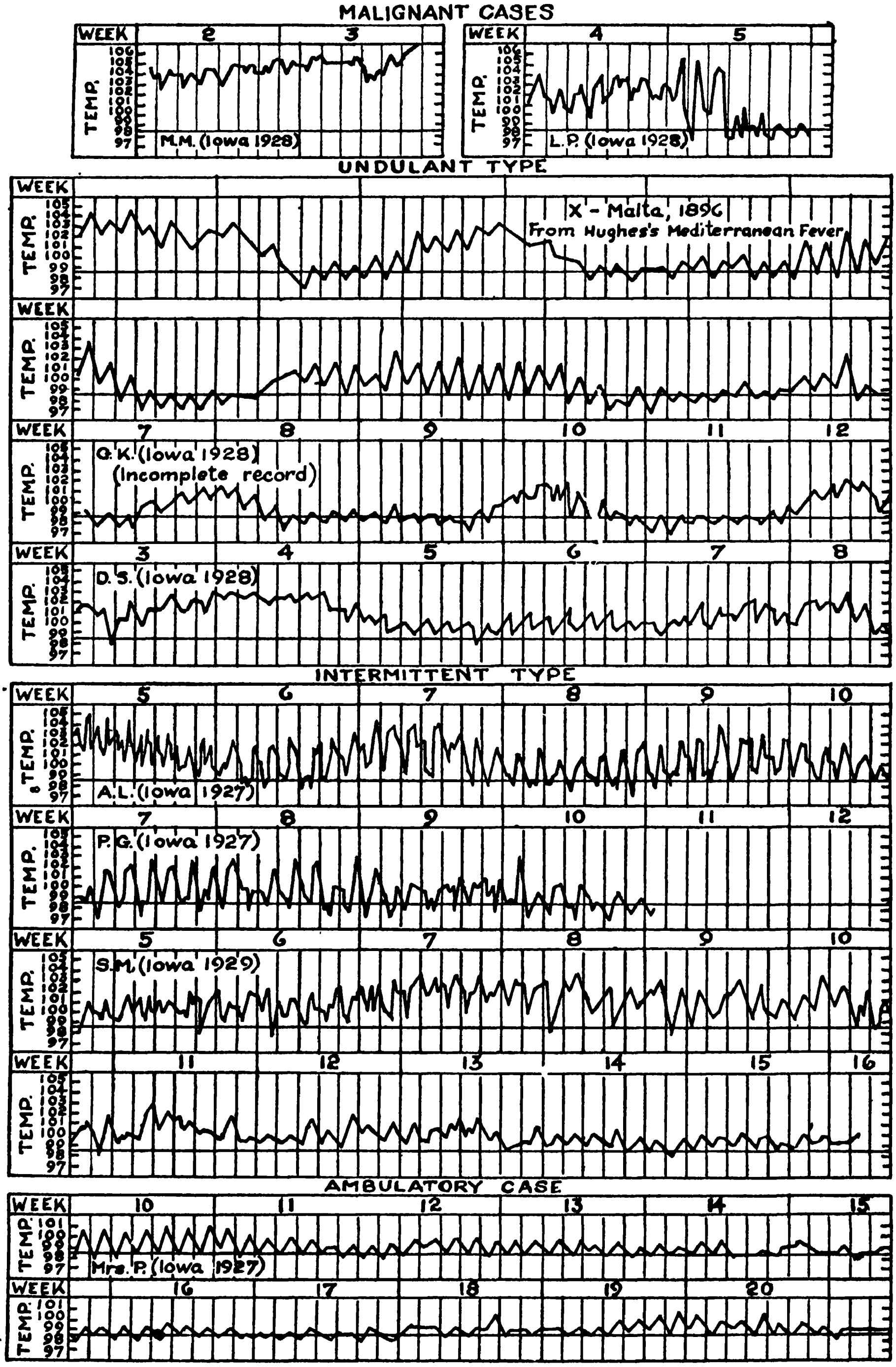

FIGURE 22.—Temperature curves in the different types of undulant fever in Iowa cases, with one chart from Hughes

our cases, but judging from the clinical histories and the available records, we found evidence of suggestive "undulatory pyrexial relapses" in less than 15 per cent, and in these this feature was rarely outstanding. Simpson found undulations of fever in 12 per cent, while in Kern's collected cases they were described in 9 of the 21 cases in which the nature of the temperature curve was stated. The higher proportion in Kern's series is possibly accounted for by the fact that the occurrence of this unusual type of temperature led to the reporting of some of these earlier cases of *Brucella* infections. Very few temperature curves of the malignant type have been observed; only a small percentage had definite undulations. Not uncommonly an intermittent type was followed by one or two relapses, usually of short duration, which came after a few days or even after a period of months of apyrexia. The usual chart showed an intermittent fever, the temperature gradually increasing during the period of invasion and disappearing by a slow lysis. In ambulatory cases, the height of the temperature was variable and was readily increased by overexertion. It was also noted that there were often peaks of fever in convalescence brought on by undue exercise.

There was frequently a wide discrepancy between the degree of fever as registered by the thermometer and the patient's sense of feverishness. It was not uncommon for a patient to apply to his physician without complaint of fever, yet to his own and the physician's surprise he would actually have a temperature of 102°, 103°, or even 104°. Obviously fever occurring without, or with little subjective feverishness might lead to clinical error. The following advice is as appropriate in America to-day as it was in the Mediterranean countries when this statement was made by Hughes more than 35 years ago: "It is always well to take the temperature of a case reporting sick with symptoms of dyspepsia, debility, etc., as a preliminary measure, and if there is any doubt, take it during the afternoon or evening. Fever is often overlooked for want of such precautions, and cases are treated for slight symptoms for some time before the real condition is discovered, to the detriment of the patient's health and the doctor's reputation."

Pulse.—Usually the pulse varied directly with the temperature, but there was no constant relation between these curves. Occasionally an unduly rapid pulse was observed; other cases showed a slow pulse similar to that of typhoid. Frequently the heart rate remained within normal limits.

Urine examination.—The urinalysis frequently revealed the trace of albumin commonly found in febrile diseases. In some, the presence of numerous pus cells indicated either secondary infection or localization of the specific infection in the genito-urinary tract.

Blood examinations.—A secondary anemia usually occurred with the hemoglobin and red blood cells both decreased, the amount of decrease depending directly on the severity and duration of the disease. Variations from normal in the total white blood cell and differential counts were commonly noted, and all observers are in general agreement concerning these variations. A leucopenia was the rule, though rarely of marked degree; a white blood cell count within normal limits was not uncommon; a leucocytosis was very unusual. The differential count usually revealed a decreased neutrophile percentage. The cells accounting for the lymphocytosis were large mononuclears, of which some were pathological forms. The eosinophils and basophils did not show any essential change from the normal. Whether the total and differential counts vary in different periods of the disease has not yet been ascertained.

Duration.—Most patients have found it difficult to tell at just what date recovery from the infection took place. The onset also was insidious; hence one could not accurately determine the total duration of the disease process. However, we have been able to measure the period on 212 of our patients from the time the patient found difficulty in continuing his regular work until he was free from symptoms and able to resume it. The percentage by periods are as follows: One month or less, 19 per cent; 1 month to 10 weeks, 27 per cent; 3 to 4 months, 34 per cent; 5 to 6 months, 11 per cent; more than 6 months, 9 per cent. The average total duration was therefore about 3 months.

Only the few patients who were acutely ill were ever strictly bedfast. Early in the disease and in convalescence patients were up and dressed, resting on a couch perhaps during the afternoon. Even during the fastigium most individuals got up for toilet purposes and in the morning many insisted on sitting in a chair or walking about for a short time. Records of "time in bed" therefore simply estimate the period during which the patient spent most of the time in bed. Those who got up, dressed, and went about, though being forced frequently to lie down to rest, are now regarded as ambulatory. Making determinations in this way, we have found that 9 per cent spent more than 10 weeks in bed; 24 per cent, 1 month to 10 weeks; 33 per cent, 2 weeks to 1 month; 8 per cent, 1 to 2 weeks; and 26 per cent were in bed less than 1 week, or were entirely ambulatory.

COMPLICATIONS

These have been seen so rarely that detailed descriptions are not possible at this time. The following, however, have been observed in *Brucella* infections:

Endocarditis.—The occurrence of endocarditis associated with a *Brucella* bacteraemia, which brought about a fatal termination of a

clinical case of undulant fever, has already been indicated. The failure, after repeated attempts to isolate organisms other than *Brucella* from the blood stream and the absence of corresponding findings of other infections, strongly indicates that endocarditis was due specifically to *Brucella*. This complication, associated in one case with pericarditis, occurred in 1 per cent of our cases.

Arthritis.—We have already pointed out that any detectable hydrarthrosis or swelling of the joints was unusual in our cases, occurring in less than 2 per cent. Tenderness in the region of the joints was not unusual and pain on active motion was a rather frequent complaint. In one reported case (86), the specific nature of the hydrarthrosis has been established by the isolation of *Br. melitensis* var. *abortus*, from the joint fluid.

Bursitis has been described as a complication of *Br. melitensis* var. *melitensis* infection and may, therefore, be expected in undulant fever due to the other varieties of *Brucella*.

Orchitis.—This has been noted in our series in 5 per cent of the males but in one-third of these the symptoms were not severe or the findings marked. Orchitis has appeared during the invasion, in the fastigium, and during convalescence. Its usual duration was two weeks, after which time it completely subsided. Simpson (63) mentioned the occurrence of this complication in a much higher percentage of his cases, though he does not give details. Whether the infection involved only the testis, or the epididymis as well, we have not been able to determine from reported observations.

Mastitis.—In two of our cases (3 per cent of the adult females) a bilateral mastitis occurred as a symptom and sign of onset. Both patients were nonlactating, and the infections, which were of a mild degree, subsided spontaneously after 10 days to 2 weeks.

Abortion.—We have observed but one infection during pregnancy. The condition proceded normally. However, there are reports in the literature of abortion associated with *Brucella* infection. Kristensen (60) isolated *Br. melitensis* var. *abortus* from the placenta in one case. Simpson (63) reported agglutination of *Brucella* antigen by the serum of five women who had no signs of syphilis, but who had repeatedly aborted. Four of these patients gave histories suggesting previous attacks of undulant fever. Prolonged observation will be necessary to determine the frequency of abortion as a complication or sequel of undulant fever.

Miscellaneous.—Associated with our cases, or described in the literature, are the following additional complications: Pulmonary abscess, oophoritis, pyelitis, cystitis, nephritis, seminal-vesiculitis, prostatitis, and broncho-pneumonia. The significance and etiology of these can be determined only by further study.

SEQUELÆ

We have attempted by means of a questionnaire to follow the Iowa cases in order to obtain data in regard to persisting symptoms and sequelæ. Eighty replies have been received. Since this follow-up letter was not sent at a regular period after apparent convalescence, the replies in different cases are scarcely comparable. The striking feature, however, was the prolonged period of disability after the subsidence of fever. This was much more than one would expect following an illness in which there were few acute symptoms. Its occurrence renders the incidence of the infection more serious. In one-half of the cases weakness or easy tiring was the longest persisting symptom. Other continuing symptoms which were mentioned more than once were fever, stiffness or pain of muscles or joints, headache, backache, general aching, anorexia, palpitation, and sweating.

Seventy patients replied that there had been no fever or other illness following the original infection. In one patient there was a persistent and possibly unrelated pyelitis. Two patients with the undulatory type, whom we considered well, had had further recurrences of fever. This was true of seven others who had previously had but one attack of fever. The following answers are taken from this latter group: "For about 12 months following my illness I had recurring spells of fever. These would last from one to three days, and following them I would be tired for several days. The spells were not serious and did not take me from my work." A packing-house employee, after apparent recovery, stated: "I had another illness which resembled in every way undulant fever. There were chills, fever, sweats, aching in joints and muscles, and general prostration." This last period of illness continued for eight days as compared with three months' duration of the first.

Fourteen patients reported that in convalescence there had occurred mild or moderately severe joint pains. This involved, in the order of their frequence, knees, shoulders, ankles, hips, and wrists. In half of the cases one joint only was affected. Swelling or redness was not mentioned in any instance. In some the discomfort was described as a stiffness. This symptom is known to have persisted for more than two months in only three instances. Symptoms which suggested a neuritis were reported by three patients. We have also had reports of a few cases in which mental depression or nervous irritability was a serious and prolonged sequel.

DIAGNOSIS

Undulant fever is an infection having neither a pathognomonic symptom nor sign. Moreover, patients rarely appear dangerously ill; hence the taking of a detailed history and the performance of a

complete physical examination are readily neglected. In addition, practitioners have not been familiar with the nature of this infection, nor are they accustomed to consider it in differential diagnosis. It is for these reasons, we believe, that admittedly erroneous diagnoses have been made in so many of the cases. It has been gratifying, however, to see the accuracy with which undulant fever was diagnosed when once the physician had seen cases or had familiarized himself with the clinical characteristics of the disease.

The importance of laboratory tests in diagnosis has been stated repeatedly. Stitt, for example, says: "Once there is a suspicion of Malta fever, one should try to confirm it by the more accurate method of agglutination tests or blood cultures, rather than from clinical observations." The laboratory procedures which are of value in diagnosis are the agglutination tests, cultural studies, and white blood cell and differential counts. Of these three the one of greatest value in differential diagnosis is the agglutination test. It is usually readily available, often without cost to the patient or physician. It may be urged, therefore, that this be more frequently used in the investigation of febrile illnesses. In those infections with an insidious onset, agglutinins can usually be demonstrated when the patient first applies for medical advice; in those with sudden onset, they may not appear until the end of the second week, or, according to Simpson, (63) occasionally not until the fourth week. Apparently it is true of undulant fever as of typhoid, that infrequently the serum of an infected individual may persistently fail to show any agglutinins. It must always be remembered also that a positive agglutination test may be related to past or subclinical infection, and not to the present ailment of the patient. Blood, urine, and stool cultures are all valuable in the study of suspected cases of undulant fever, but these are only practical in diagnosis when the patient is within easy reach of a laboratory. In this infection any cultural study will consume at least one week, and a negative report on a blood culture can not be made reliable until the end of the third or fourth week. Moreover, negative cultural findings on one examination can scarcely be given any weight. Cultural studies are, therefore, limited in their applicability as a diagnostic test.

The white blood cell findings in undulant fever are in no way peculiar to this infection; still a leucopenia with a lymphocytosis will serve to rule out all but a few conditions with which this disease may be confused.

The skin test is advocated as a valuable diagnostic procedure by Giordano (87), Simpson (63), and others. We have had little experience with it, and have encountered only a few cases in which it might have given additional evidence of value.

DIFFERENTIAL DIAGNOSIS

We have noted in our case records the erroneous diagnosis, provisional diagnosis, or impressions of attending physicians. We found the three most frequent erroneous diagnoses to be typhoid fever, influenza, and tuberculosis. There were also included malaria, pyogenic septicemia, and various respiratory infections (bronchitis, sinusitis, and pneumonia). Appendicitis and cholecystitis accounted for 7 per cent of the erroneous impressions, the former being seriously considered twice as often as the latter. Disease of the cardiovascular system has been diagnosed, including subacute bacterial endocarditis, pericarditis, and hypotension. Infections of the genitourinary system were also in the list, including cystitis, pyelitis, pyonephrosis, orchitis, and epididymitis. Other infrequent impressions were liver abscess, infantile paralysis, spastic colitis, carbon-monoxide poisoning (chronic), tetanus, and such conditions as "nervous breakdown," "liver trouble," and "eye trouble." In none of our cases was acute rheumatic fever or tularemia suspected, but these also may be considered in differential diagnosis.

When the nature of undulant fever is not known and when it is not considered in differential diagnosis, or when immediate complaints or local conditions only are considered, one can readily understand how the above-mentioned clinical impressions may be formed. When the physician, however, is armed with the facts, most of these possible diagnoses can immediately be dismissed. Some, however, may often present difficulty. The differential features of these may be briefly discussed.

Typhoid and paratyphoid fever.—The more rapid onset, the dull, toxic appearance of the patient, the diarrhea and tympanites, the sustained temperature, and absence of sweats usually lead to a correct opinion, while a positive Widal, or the isolation of *B. typhosus* or *B. paratyphosus* establishes the diagnosis. It may here be urged that sporadic cases of typhoid fever are becoming more and more rare, and prolonged fevers, without localizing signs, which occur sporadically, demand a consideration of undulant fever.

Influenza.—About 20 per cent of the cases erroneously diagnosed were called influenza. This is not because undulant fever has any similarity to the acute respiratory infection which occurs in pandemics or epidemics, but because the name is used as an accepted label for all indefinite fevers. We can but advocate a more careful and general consideration of undulant fever and less misuse of the name "influenza" as such, or its corrupted forms "flu," "intestinal flu," and "summer flu."

Tuberculosis.—There may often be a real difficulty in the differential diagnosis of *Brucella* infection and pulmonary tuberculosis. The

insidious onset, weakness, night sweats, anorexia, and loss of weight are common to both, and cough also may be a prominent feature of undulant fever. The chilliness or rigors, the general aching, headache, backache, or arthralgia, the constipation and nervous irritability all point to undulant fever. Laboratory tests usually readily settle the diagnosis.

Malaria.—The regularly repeated rigors which sometimes occur in undulant fever may suggest malaria. A careful history and a resort to the available laboratory tests will establish the diagnosis in either disease.

Pyogenic septicemia.—A leucopenia, or a normal white blood cell count associated with a lymphocytosis, which is ordinarily observed in undulant fever, usually accurately differentiates this disease from pyogenic infections. Cultural studies and agglutination tests may be necessary.

Subacute bacterial endocarditis.—The course of this disease may simulate closely that of undulant fever. The weakness, remitting fever, loss of weight, and anæmia are characteristics common to both. Sweating may occur in cases of subacute bacterial endocarditis. Moreover, in undulant fever there may also be an endocarditis, presumably caused by *Brucella*. When this does occur, the diagnosis may depend wholly upon laboratory studies, blood counts, cultures, and agglutination tests.

Acute rheumatic fever.—We have encountered no case in which this diagnosis had been considered. The striking absence in our cases of any physical abnormality of the joints probably explains this. The arthralgia of undulant fever was often shifting in nature, but the definite swelling or hydrarthrosis, when it did occur, remained localized in the joint or joints attacked. The acute onset and course of rheumatic fever is in striking contrast to the insidious onset and the subacute course of *Brucella* infection.

Tularæmia.—The clinical characteristics of the ulceroglandular, glandular, and oculoglandular types of tularæmia are so striking that a clinical diagnosis of this infection is usually made with ease. However, in the typhoid type, which is of rare occurrence, there may be confusion with undulant fever. Moreover, in differentiating these infections the agglutination test may be misleading, owing to the phenomenon of cross agglutination. *Brucella* antigens may be agglutinated in diagnostic titers by the serum of tularæmia patients. Hence if in that infection a test is performed for undulant fever only, agglutination of *Brucella* may lead to an erroneous diagnosis. If there has been any history of a possible exposure to *B. tularense*, agglutination tests for this as well as undulant fever should be requested. The agglutination results are usually conclusive.

Appendicitis and cholecystitis.—Fever, abdominal pain, and localized tenderness are the misleading features. When generalized infection is not considered these clinical findings may seem to be best explained by a chronic or subacute appendicitis or cholecystitis. Simpson (63) has a record of 12 appendectomies and 2 cholecystectomies which were performed on cases of undulant fever. The pathological examination revealed no evidence of inflammatory process in the organs removed. In the cases of this nature which we have observed, we have felt that appendectomy was too readily advised, and that a careful history with a complete physical examination, supplemented by blood counts, would have left no reason for surgical intervention. We have, however, seen one case with a retrocecal appendix, in which an appendicitis continued to perforation and peritonitis through hesitation, occasioned by a weekly positive agglutination reported for undulant fever. In two of our cases in which the diagnosis of cholecystitis was seriously considered, undulant fever, when called to mind, was almost at once accepted as a provisional diagnosis.

Infections of the genito-urinary tract.—Frequency, painful micturition, and pus in the urine are not uncommon features of *Brucella* infection. These may or may not be specifically related to the disease. Since these conditions have occurred late in the invasive period or during the fastigium, a careful history will usually lead to suspicion of a generalized infection with local manifestations. This is also true of orchitis when it is the major complaint.

PROGNOSIS

There has been a case fatality of 3 per cent in our cases. Deaths have occurred in infections beginning as the ambulatory type, as well as among those of the malignant variety. The duration of the infection has been variable and can not be predicted. It is apparent, therefore, that prognosis must be somewhat guarded. Particularly is this so in infections known or believed to be caused by the *suis* or porcine variety of *Br. melitensis.* On the other hand, we have found it safe to give a fair prognosis in cases which could be attributed to the *abortus* (or bovine) variety of *Br. melitensis.*

THERAPY

We can find no record of a properly controlled systematic investigation of therapy. One may find different specifics recommended, usually because of the uneventful recovery of only a few treated cases. The natural course of the infection due to the more recently discovered varieties of *Br. melitensis* is only now becoming known. Physicians too generally have assumed that it was identical with the prolonged and distressing infections frequently seen in the Mediterranean region,

and commonly described in current texts and systems. Having learned the natural course of infection with the *abortus* and *suis* varieties we are now prepared to better evaluate the different therapeutic procedures recommended. Conclusive data will only be obtained, however, by the observation of an adequate series of treated cases, and their comparison with a corresponding number of untreated ones. We feel that a study of the various specifics which have been recommended is highly important.

Available therapeutic procedures of proven value and of first importance are rest, liberal diet, adequate fluids, and appropriate measures for the alleviation of prominent symptoms. Exercise in convalescence should be followed closely by temperature records, and so modified that elevations of fever above 100° F. are prevented.

Among the therapeutic procedures of unproved value, the one most commonly recommended is the use of specific vaccine. Attention was first called to this means of treatment of undulant fever by Angle (88), who reported its successful use in 10 cases. Simpson reported the results in a larger series, as follows: "In 46 of our cases we have utilized the vaccine made of heat-killed *Br. abortus*, standardized to two billion per cubic centimeter, with such an apparently favorable result that we are now employing it as a routine treatment. The vaccine is given by deep subcutaneous injections. The usual dosage has been one-fourth cubic centimeter for three injections, followed by one-half cubic centimeter for three injections, followed by 1-cubic centimeter doses, all at 3-day intervals. The first one or two injections have been followed by a mild or moderately severe general reaction in two-thirds of our cases, following which the reaction has diminished in intensity after each succeeding vaccination. In several instances the site of injection remains indurated for many days. No necrosis or abscesses developed. Following the first two or three injections the fever usually approaches the normal level and the symptoms abate. As a general rule those patients who experience the most marked general reaction had a most rapid favorable response to the vaccine. It is hoped that other workers will give the abortus vaccine a thorough clinical trial, and report their observations. Due caution must be exercised in the evaluation of any therapeutic measure in a disease characterized by natural remissions." While this measure has not been used in a large number of the Iowa cases, we have observed rapid recovery following administration of the vaccine, but have also seen other cases whose infections continued unmodified by the same treatment.

More extensive studies have been carried out in the therapeutic value of vaccine in *Br. melitensis* var. *melitensis* infection. The opinions differ as to its value. Favorable reports are made by Bassett-Smith (89), Owen and Newham (90), Guiffre (91), DeFinis (92),

and others. Arloing (93) observed an Arthus phenomenon following its use. Alfred Coury (94) considers it dangerous while other observers regard it as of unknown value.

In three cases of *Brucella* infection Awe and Palmer (95) report recovery following the injection of nonspecific protein. Simpson (63), however, has found this to be of no appreciable value. Mercurochrome has its advocates, though Ross and Martin (96) consider that in *Br. melitensis* var. *melitensis* infection its value has not been demonstrated. Acriflavine, trypaflavine, colloidal metals, and neoarsphenamine have all been recommended, but the very length of the list shows clearly that the value of any drug, thus far advocated, has not been satisfactorily demonstrated.

UNDULANT FEVER OF BOVINE OR PORCINE ORIGIN COMPARED WITH THAT OF CAPRINE ORIGIN

The following descriptions of undulant fever of caprine origin have been taken from current medical texts: "A specific fever caused by the *Micrococcus melitensis* characterized by undulatory pyrexial relapses, profuse sweats, arthritis and an enlarged spleen" (Osler and McCrae, 1925). "A specific infectious disease * * * having a fever of indefinite duration running an irregular course and made up of a series of waves of pyrexia * * * giving rise to symptoms of toxic septicemia, with enlargement of the spleen, sweats, constipation, effusion about the joints, and pains; sometimes with endocarditis and orchitis; later associated with great anemia, multiple neuritis and hectic fever. Convalescence is tedious and mortality low" (Bassett-Smith in The Practice of Medicine in the Tropics; Byam and Archibald, 1922). One finds the following description by Hughes quoted repeatedly: "Clinically the fever has a peculiar irregular temperature curve, consisting of intermittent waves or undulations of pyrexia, of a distinctly intermittent character. These pyrexial waves or undulations last, as a rule, from one to three weeks, with an apyrexial interval lasting for two or more days. In rare cases the remission may become so marked as to give an almost intermittent character to the febrile curve * * *. Its course is often irregular and even erratic in nature. The pyrexia is usually accompanied by obstinate constipation, progressive anemia, and debility. It is often complicated with and followed by neuralgic symptoms referred to the peripheral or central nervous system, arthritic effusion * * * or swelling of the testes."

Although one finds mentioned here no features which are not observed in infection with the *abortus* or *suis* varieties of *Br. melitensis*, still there are not accurate descriptions of the latter disease. The one feature which overshadows all others in the description of undulant fever of caprine origin is the undulatory type of temperature, a

rare finding in that of bovine or porcine origin. Moreover, the effusion into the joints must have been much more common than we have observed, and the neuritis more severe. On the other hand, in our cases rigors were noteworthy but these are rarely mentioned in the descriptions of the *melitensis* variety of infections. In other respects, however, the symptoms and signs differ not at all, or only in degree. In the disease due to the *melitensis*, as well as the *abortus* and *suis* varieties of *Brucella*, premature births and abortions have been noted. The picture of undulant fever, therefore, in order to include the infections with the *abortus* and *suis* varieties, demands the placing in the background of the "undulatory pyrexial relapses," the effusion into the joints and the neuritis, and also a softening of all symptoms save possibly the rigors which should stand out more prominently. Viewing this another way, we see that in undulant fever of caprine origin the undulatory type predominates; in that of bovine or porcine it is the intermittent type that is the most common. A true description of undulant fever may only be written when we picture equal numbers of these two types, with a few of the malignant and a few more of the ambulatory varieties included.

VII. PREVENTION

In considering the prevention of *Brucella* infections in human beings and animals, due consideration must be given to the possibility of immunization. Is the injection of an adequate number of killed organisms as effective in this disease as it appears to be in typhoid fever? Experimental evidence justifies little hope in such procedure. We, as well as others, have tested a fairly large series of guinea pigs as described. Those injected with three doses of heat-killed *Br. melitensis* var. *abortus*, and which developed agglutinins in a titer of 1:80 or higher, seemed to become infected as readily as did untreated animals, when exposed by the skin route. Moreover, neither the course of the disease nor the pathologic lesions were significantly different in the treated guinea pigs and the controls. The injection of killed organisms, therefore, does not promise to be an effective prophylactic measure.

A second question of fundamental importance is the thermal death point of *Br. melitensis* var. *abortus* and var. *suis*. The recent report by Arnold (97), who found living *Brucella* after exposure to the temperature of commercial pasteurization, has demanded a reconsideration of this subject. These findings are in contrast to those of Carpenter and Boak (98), who reported all organisms to be killed after 20 minutes at 140° F. In our own tests we have not found living organisms following exposure to temperatures of 144° to 145° F. for 30 minutes, followed by rapid cooling in the ice box. Organisms were, however, cultured in one test in which the temperature was

slightly inconstant, fluctuating between 139° and 142° F. These laboratory data and our epidemiological findings demonstrate that controlled pasteurization is effective against organisms of the *Brucella* group.

At present effective control measures are those designed to prevent human contact with virulent organisms which leads to the infection of susceptible individuals. It would appear that work along this line might be best carried out by bearing in mind the chief modes of transmission of the disease, namely, ingestion of raw dairy products and contact with infected animals; also to remember that the portal of entry into the human body may be either the mouth or the skin.

MEASURES DEALING WITH THE PROBLEM AS A WHOLE

Eradication of contagious abortion in cows and hogs.—The significance of contagious abortion in its relationship to disease in man equals, if it does not exceed, bovine tuberculosis, and is in like manner primarily a problem of the veterinary medical profession. In the prevention of undulant fever, as in no other disease, members of the human and veterinary medical professions are called upon to unite forces in a common attack.

Agglutination tests.—Those familiar with the epidemiology of this disease are impressed with the advisability (preferably required by law) of routine agglutination tests to determine the presence or absence of infection in animals.

Bacteriological studies needed.—It is apparent that further intensive studies need to be conducted to determine the presence, variety, and pathogenicity of strains of *Brucella* in cow's milk, cream, and raw dairy butter. Further work is likewise indicated to determine the distribution of porcine organisms in the various organs, tissues, and discharges of actively infected hogs. More accurate knowledge of these might throw much light on the means of avoiding exposure and hence of preventing infection.

Health education.—Health education should be conservative and guarded, but it is essential that accurate information be conveyed so that the groups concerned may more intelligently practice preventive measures. The public should be so taught that people will demand safe dairy products, without diminishing the consumption of the same; the stock breeders so that they will work for healthier and more productive animals.

MEASURES DESIGNED TO PREVENT TRANSMISSION THROUGH RAW DAIRY PRODUCTS

On the farm.—It should be a relatively simple matter, particularly when families are supplied with the milk of but one or a few cows, to have these tested serologically. It is apparent—considering dosage,

repeated exposure and absence of the dilution factor—how potent are the possibilities of infection if the disease occurs in a small herd. It is encouraging that, by means of agglutination tests associated with bacterial studies of milk where practicable, and with the isolation or elimination of known infected animals, the transmission of this infection may be controlled without prohibitive expense.

In cities and towns under 5,000 population.—It would seem advisable to require that all dairy cows pass satisfactorily an agglutination test before such milk be distributed in raw form. The wider use of properly pasteurized dairy products ought to be encouraged in every way possible.

In cities over 5,000 population.—Measures applying to smaller cities are indicated also in the larger centers. Adoption and enforcement of a standard milk ordinance, including the requirement that the contagious abortion test be applied to all dairy cows and that dairy products be pasteurized, is a consummation much to be desired. Undulant fever is only one more condition added to the already formidable list of diseases transmitted from time to time through the use of raw milk and cream.

Municipal and county health departments.—These are, wherever established, an effective means of carrying out the above-mentioned measures.

MEASURES DESIGNED TO PREVENT INFECTION THROUGH CONTACT

On the farm.—Precautions here are largely of a prophylactic nature and consist in the avoidance, to as great a degree as possible, of what may be termed special types of contact. These occur in such procedures as vaccinating, ringing, or castrating hogs, in the handling of new-born pigs and in loading or unloading hogs for market. It is felt that such direct forms of hog contact are significant, and that the chances of infection might be materially reduced through appropriate measures, such as wearing of heavy gloves whenever such contact is necessary. Many of these special types of contact might be avoided if farmers were taught to appreciate their significance. Farmers will do well also to avoid the direct contact with infected bovine tissues incident to manual removal of placentae.

Others having direct contact with livestock.—Livestock dealers represent another group exposed in special ways through direct contact. A growing knowledge, on their part, of the intimate relationship existing between contagious abortion in animals and undulant fever in man should reduce to a minimum all but casual or relatively insignificant contacts with hogs. Veterinarians as a group have the most direct types of contact with cows. Their remarkable freedom from active undulant fever infection probably indicates that cattle contact is relatively less significant than hog contact and the practice of

aseptic precautions is no doubt a factor in lessening exposure to infection in members of the veterinary medical profession. The possibility of an immunity being acquired by this group can not be set aside.

Packing-house workers.—No other group is exposed to this infection through direct contact in any way comparable to packing-house workers, who handle the naked tissues of large numbers of infected animals brought together from wide geographical areas. It is felt that contact infection in employees on the killing floor may be reduced by giving more prompt attention to the care of minor knife wounds or cuts. Such workers might possibly be assigned less hazardous employment during the healing of wounds. Protection with gloves might be of some value. Effective measures need to be adopted in this group of persons, to materially decrease the hazard of undulant fever infection.

VIII. APPENDIX

A. EPIDEMIOLOGICAL CASE RECORDS

Case 1 A.—E. B., female, aged 45, housewife, living in a city of 50,000 population. Had no significant travel, and no direct or indirect contact with livestock. No pets were kept. Raw milk and cream, purchased at a small grocery store, were used by the family. The patient used milk freely with cereal and fruits, but drank not more than one glass daily. Creamery butter only was used. Of the 20 cows in the herd supplying the milk used by this family, 4 were negative, 6 gave reactions in titers of 1:40 and 1:80 only, and the remaining animals were definitely positive.

Case 2 A.—W. B., male, aged 26, single, stone-quarry worker, living in the country. He had taken local trips only. The family kept one cow—the only livestock on the place—but the patient rarely had direct contact with this animal. He drank little milk, but used cream and home-churned butter very freely. The patient's mother, during the previous year, had had tularaemia, and primarily to determine if agglutinins for *B. tularense* still persisted, a specimen of her blood was taken. She made no complaint, but remarked that for a few days during her son's illness she had noticed some lassitude and weakness, but did not consider herself ill. Her serum titer for *Br. melitensis* var. *abortus* was 1:1,280; for *B. tularense* 1:160.

Here was a mild infection, accidentally detected. The one cow was examined and showed a serum agglutination of *Br. melitensis* var. *abortus* in a titer of 1:80. Milk was also obtained, and the whey agglutinated in a dilution of 1:20, a titer so low as to be ordinarily disregarded. The cream was injected into guinea pigs, and *Br. melitensis* var. *abortus* was isolated.

Case 3 A.—G. F. C., male, aged 46, physician. Recently had taken short local trips only. Had no direct contact with livestock. Used raw milk very freely, from 1 to 3 quarts daily, supplied by a distributor who purchased from several different farmers. An examination of the herds involved was not attempted.

Case 4 A.—H. P., male, aged 50, farmer and hog raiser. Had not traveled recently. On his farm he had assumed the responsibility for all work around the hogs. He used raw milk and cream freely, obtained from his own cows. There was no history of contagious abortion among the cattle, and he "always had good luck with the hogs." Blood specimens were obtained first from the cows, but no reactors were found. The source of the patient's infection remained undetermined. Three months later, during convalescence, his son, aged 20, became ill

and was also found to have undulant fever. A second visit was made and it was learned that during the father's illness this son had cared for the hogs. Careful questioning then elicited the history that one sow had been known to lose her young, but this was considered accidental. There had also been some trouble with sterility. The hogs were examined, and of the 19 tested, all sera, except 3, agglutinated *Brucella* in diagnostic dilutions.

Case 5 A.—H. L., male, aged 40, farmer. Used raw milk, cream, and homemade butter freely. One of his 10 cows had aborted during the preceding year and remained sterile, and another was also considered as sterile. Among the hogs there was no history in any way suggestive of *Brucella* infection. Serological findings revealed no reactors among the cattle, but of the hogs examined three were positive, four doubtful, and eight negative. The farmer had had the usual contacts with his stock. From his blood stream a *Br. melitensis* var. *suis* organism was isolated.

Case 6 A.—G. W., male, aged 52, farmer. Except for short business trips to a near-by town, the patient had been at home. He drank milk very freely, and used cream and homemade butter in liberal quantities. One of his four cows had aborted and the milk from this animal was used with that from the others. His sows had all raised good litters and his ewes had given birth to a normal number of young. The serological findings were as follows: Cows, 1 positive, 3 negative; hogs, 18 negative; sheep, 11 negative, 1 doubtful.

Case 7 A.—A. W., female, farmer's wife. She had frequent and direct contact with the cows, but only indirect contact with the hogs. Used milk and a small amount of cream with coffee and cereal. Creamery butter was puchased. Among the six cows there had been two abortions and one of these had been followed by sterility. There had been no known abortion among the hogs and litters of good size had been raised. Laboratory examinations revealed as follows: Cattle, 1 positive, 7 negative; hogs, 11 positive, 5 doubtful, 1 negative.

Case 8 A.—A. F., male, aged 22, packing-house employee. He had always lived in a city of 30,000 population, and had no direct contact with livestock. He used no fresh dairy products, but supplied himself with condensed milk and oleomargarine. In the packing plant he worked in the hog division, and his duty consisted in trimming the fat from off the sigmoid near the rectum. Fecal contamination was frequent. Cuts or scratches on his hands were infrequent. *Br. melitensis* var. *suis* was isolated from his blood.

Case 9 A.—P. M., male, aged 16, farmer's son and high-school pupil. Had not traveled. Never drank milk and rarely used cream. Creamery butter was purchased. There were four cows on the farm; all were apparently healthy and were serologically negative. Of 17 sows, only 5 raised pigs; the others had aborted. Prior to the onset of illness the patient was attending school and had no direct contact with the hogs. There was on the farm a bitch that had aborted four months previously, but later gave birth to a litter of normal pups. This animal was the boy's particular pet, and in play contact was intimate. We obtained the animal for study. Repeated serological tests were positive, although bacteriological findings were negative. The farmer volunteered the information that the sows after abortion had a persistent vaginal discharge, and the bitch was often seen following the animals and licking the discharge.

Case 10 A.—The R. family. In July, 1929, Mr. R. contracted undulant fever, from which he was recovering when seen in October. He used all dairy products very freely. Among his cattle and hogs the only history suggestive of *Brucella* infection was the case of one cow which had had a retained placenta and was later sold because of sterility. Another cow, still on the farm, was also possibly sterile. Serological examination revealed: Cows, 1 positive, 2 doubtful, 3 negative; hogs, 3 positive, 2 doubtful, 9 negative.

During August this patient's son, aged 10, became ill with symptoms very characteristic of undulant fever. No blood specimen was sent at that time. After five weeks he rapidly convalesced. A blood specimen, taken in October, failed to show agglutinins, but clinically the case had been undulant fever. This lad had had some contact with both the cattle and hogs and used milk and cream freely. Cautioned regarding the possible danger in the use of raw milk, the family ceased drinking it unless it was scalded. However, they continued to use raw cream, and from it made butter for their own use. In December, Mrs. R. contracted the disease. From her blood *Br. melitensis* var. *suis* was isolated. She used very little cream or butter and had had no contact with the livestock, but handled and churned the cream. The test of milk from the one reacting cow failed to reveal *Brucella*.

Case 11 A.—The H. family. One positive blood specimen had been received from a physician serving a rural clientele. An investigation was made later, at a convenient time. That there had been an exceptional occurrence of the infection was apparent, when the physician said that he thought there had been two or three other cases in the farm household. The family consisted of intelligent parents with six children, ranging in age from 2 to 8 years. During the previous five months the husband had had typical undulant fever; two children had had febrile illnesses of six and four weeks' duration, with the symptoms and findings of the same infection; one had had a prolonged atypical attack, while two other children and the mother had had an ailment, with fever, of short duration only. The oldest child had apparently been well throughout. Blood was obtained from all; from four of the children only a dried blood specimen could be collected. The four microscopic tests showed titers of 1:160, 1:320, 1:320, and 1:640. Two of the microscopic tests showed small clumps in the 1:40 and 1:80 dilutions—a reaction which we regard as suspicious. The findings justified the opinion that at least six, probably all, of the family had been infected.

There was no history even suggesting contagious abortion among the cattle, though 2 of the 11 cows were serologically positive. Three years previously several of the sows had aborted, but none since that time. Of the 10 examined serologically only 1 showed a titer as high as 1:40. Milk shipped to us from the two reacting cows failed to reveal *Brucella* by guinea-pig injection. The true explanation of the occurrence of infection in this family is therefore quite uncertain.

B. CLINICAL TYPES

INTERMITTENT TYPE

Case 1 B.—E. B., male, aged 40, farmer and hog raiser. Late in December, 1926, he noted that he was unusually tired in the evening and that his appetite was somewhat impaired. During January, 1927, the weakness increased. There were sleeplessness, more marked anorexia, occasional feverishness, and irregular night sweats. He was also troubled at times by backache, and complained of a stiffness of the neck. Symptoms progressively became worse. Early in February he consulted his physician and an elevation of temperature was found. Pyorrhea was noted, but otherwise the physical examination was negative. Dental examination, with X ray, was advised. Several apical abscesses were revealed. The teeth concerned were extracted. One week later the physician was called to the patient's home. He found an obviously ill man, with a moderately high fever, and distressing joint pains. A pyogenic septicemia was considered and a blood culture was taken. Blood for a Widal test was sent to the State hygienic laboratory, to rule out typhoid, and this, examined routinely for undulant fever, was found to agglutinate *Br. melitensis* var. *abortus* in a 1:320 dilution. Two later tests were also positive. The blood culture was dis-

carded after 72 hours' incubation, at which time the subcultures showed no growth. Throughout February and March the patient was bedfast. So profuse were the night sweats that quite regularly the bed linen would have to be changed between 1 and 2 a. m. His wife, who nursed him, reported that through his illness he was restless and quite irritable. There was a gradual loss of weight. The fever was somewhat irregular, varying from normal to 101° in the morning and 101° to 103° in the evening. An unusual feature of this case was a definite arthritis, with effusion into the knee joints. There was an uneventful convalescence which covered a period of two months, following which the patient gradually returned to work. Twenty months later he reported that he had been enjoying good health.

Case 2 B.—A. F., male, aged 38, farmer. About the middle of August, 1929, patient noted that in the evening he would be unusually tired, lacking appetite, and frequently complaining of headache. These symptoms persisted, and one month later he consulted an oculist. Lenses were prescribed, but the frontal headache persisted. He then consulted his physician, who accurately diagnosed his ailment. Two blood serum tests showed agglutination for *Br. melitensis* var. *abortus* in 1: 2560 dilution. Early in November, when we saw him, he was still ambulatory. His chief complaints at that time were profuse night sweats, rigors, of which he had had 10, and diffuse lower abdominal pain. He had moderate backache, some joint discomfort described as stiffness, and constipation. At noon we found his temperature to be 102.5° (unusually high for that hour, he explained, since he had had to do quite strenuous work that morning). Ordinarily, the temperature was normal until noon, reaching a maximum of 102° to 105° in the early evening.

The patient's own disability and our advice were at first not sufficient wholly to restrict his activity. He became strictly bedfast, only when a unilateral orchitis and epididymitis developed a few days later. Throughout October the patient continued to be quite ill. During November he improved rapidly, but during this month there developed a condition which was diagnosed as teno-synovitis of the right hand. At the end of the month there was still a low-grade fever and moderate weakness. The appetite was very good, and weight was being regained. By January the patient considered that he had fully recovered.

AMBULATORY TYPE

Case 3 B.—B. N., male, aged 38, farmer. There was an insidious onset during April, 1929. During the first six weeks of illness the patient thought he had "chronic flu". Because of the persistence of the symptoms, he applied to his physician at the end of this period. He reported that he had a moderate weakness, though in the morning he ordinarily felt fairly strong, but in the afternoon he was able to do little. He complained of general aching, some headache, chiefly behind the eyes, but also in the lower occipital region, and back of the neck. He had no definite joint pains, but complained of muscular soreness and stiffness. "I could scarcely move," was his own description. Night sweats had occurred, but these were not profuse. These symptoms varied somewhat in severity and persisted throughout the summer. His appetite was never good, and he was troubled with constipation. More than 20 pounds of weight were lost. A nonproductive cough persisted throughout the illness. The fever occurred only in the afternoon and evening and was rarely above 101°, but reached a maximum of 103°. This patient also noted that the more active his exercise, the higher the temperature rose. Except for the coarse râles, and a moderate tenderness in the upper abdomen, the physician reported no abnormal physical findings. Laboratory tests showed a blood serum agglutination for *Br. melitensis* var. *abortus* in 1:320 dilution in June, and in 1:80 in November.

Throughout his illness of seven months' duration, the patient continued to do the necessary work on his farm. He obtained extra help only during the more strenuous season of harvest and threshing.

Case 4 B.—T. T., male, aged 13, doctor's son. This illness began insidiously during October, 1928. The lad's parents first noted that he was less eager to play in the afternoon and was not interested in the evening meal. The boy complained of some headache, which he described as pain in the eyes and back of the neck. An evening temperature of 99.5° to 100° was found. There were no other abnormal physical findings. The father restricted the boy's activity for one week, but throughout the remainder of the mild illness, which lasted one month, he lived normally. His blood serum gave an agglutination for *Br. melitensis* var. *abortus* in 1:160 dilution.

UNDULATORY TYPE

Case 5 B.—G. K., male, aged 43, farmer. Patient's illness began about December 15, 1928. He noted marked weakness, a moderate anorexia, general aching, particularly in the lumbar and cervical regions, and some fever. By January 1 he felt that he had recovered from an attack of "la grippe." Shortly after the new year the same symptoms reappeared, this time more severe, and the physician was consulted for the first time. During January and February he had at least four attacks of fever, with apyrexial intervals, in which he did not feel ill. His case was diagnosed as typhoid and typhoid flu, but on analysis of a blood specimen sent to the laboratory, by the third physician consulted, the diagnosis of undulant fever was established. The titer found was 1:1280. On March 1 the patient was admitted to the university hospital during an apyrexial period. Five days after admission the fever reappeared and increased daily for four days, reaching a maximum of 101.8°. Following this it gradually subsided, reaching normal four days later. During this febrile period patient's only complaint was constipation. He noted some feverishness, did not enjoy reading, and was less interested in his food. He did not, however, appear ill and no notable physical abnormality was detected throughout the illness. On March 15 the patient was discharged, and from that time his progress was followed by correspondence. Letters of March 24 and April 25 reported recurrences of fever. The note of the latter date, after describing the early symptoms of these attacks, read as follows: "I had almost forgotten how I did feel when I was sick, but it all came back, the ache and pain in my limbs, the headache and backache, the soreness across my bowels, and constipation. I didn't have any chill this time, but my fever broke about 2 a. m. to-day, and I sure did sweat." The patient considered that his symptoms were most severe during what proved to be his last febrile period. A later letter, on June 1, stated that he had no fever, but was still weak, even though doing light work.

Case 6 B.—M. C., male, aged 38, farmer. This patient was unable to give any date of onset, but stated that during the spring months of 1927 he noted that he tired easily and had headache which gradually became more frequent and severe. Early in June he first consulted his physician, making an office call when he had a temperature of 103.2°. His symptoms at that time were marked weakness, profuse night sweats, rigors, anorexia, and constipation. Shortly after this the patient came to the hospital. His temperature was found to be remitting, normal or about normal in the morning, and 102° to 103° in the evening. The physical examination was negative except for slight abdominal tenderness. The agglutination test was positive for undulant fever. The patient did not consider himself sufficiently ill to remain in hospital, and after 10 days insisted on being discharged. The fever gradually subsided and with this his symptoms disappeared. Two relapses occurred, the first after six weeks, with a duration of two

weeks, the second after four months lasting one week only. During the relapses his symptoms were mild in degree though similar in nature to those in the original attack.

MALIGNANT TYPE

Case 7 B.—L. P., male, aged 26, a packing-house employee and laborer. Serum agglutinated *Br. melitensis* var. *abortus*, in diagnostic dilution. The onset of his acute illness was preceded by a definite complaint for a period of almost one month, of lassitude, headaches, and drowsiness. During this time he continued at work. For three days before a physician was called the patient was quite ill. During that period he had marked prostration, complained of some headache and backache, and an acute pain in the back of the neck. The physician reported that the temperature at first was regularly remitting, but observation showed an increase by daily additions of one degree until 104° was reached. It was then sustained for 10 days at a high level. During this period the patient was acutely ill. Early in his acute illness he had one rigor. Throughout he had marked constipation. Delirium and coma rapidly developed. A fatal outcome seemed certain. Unusual in the course of this illness was the rapid enlargement of the spleen. At the time of the first consultation the physician reported that the organ was not palpable. Four days later it could just be felt, and one week after this its lower margin had reached the umbilicus. After the 10 days with high fever the temperature dropped almost by crisis. The spleen decreased in size as rapidly as it had increased, and convalescence proceeded uneventfully.

C. ATYPICAL CASES

Case 1 C.—B. H., male, aged 15, a packing-house employee. During the period of invasion patient felt weak and able to work only part time. His physician was called after one week, at which time the history revealed weakness, gradually increasing fever, epistaxis on four occasions, spells of chilliness, two rigors, considerable abdominal pain, anorexia, and headache. The temperature was found to be 104°, the pulse 90, and respiration 25. The patient appeared dull and drowsy. During the following days the abdominal discomfort persisted. There was moderate tympanites, with intermittent diarrhea and constipation. There was some cough with slight evidence of bronchitis and sinusitis. Sweating did not occur. During the third week of observation the patient was very toxic and delirious. The temperature throughout ranged from 104° to 105°, with only slight morning remissions. The pulse was not rapid. Four white blood counts read as follows: 5,000, 5,600, 4,250, and 3,800. The temperature had returned to normal one month from the date that the physician was first called. The serological studies gave the following results: Widal tests were persistently negative and on the four different occasions when *Br. melitensis* var. *abortus* was agglutinated, the titers were 1: 1,280 and 1: 2,560. A blood culture yielded *Br. melitensis* var. *suis*. After a period of 10 days without fever, the patient suffered a relapse and, though the temperature reached 103°, he was much less dull and toxic, presenting the usual picture of undulant fever.

The attending physician and others examining this case agreed that without laboratory findings this case would certainly have been diagnosed as typhoid fever.

Case 2 C.—F. B., male, aged 26, farmer. There was no history of tuberculosis in the family. The onset was very insidious, the patient stating that he "had not been feeling fit all fall." In January, 1930, he first consulted his physician, at which time his major complaints were progressively increasing weakness, fever, cough, and night sweats. Additional inquiry revealed that he had also spells of chilliness, two rigors, severe pain in the back of the neck, anorexia, moderate

irritability, sleeplessness, and very profuse sweats. He had also lost weight. During the following months, the condition which was not definitely diagnosed did not improve and the family requested a consultation. A diagnosis of tuberculosis in its worst form was made; the patient, his wife, and parents were acutely distressed by the outcome, but acting on the advice of the consultant, the young man prepared to sell his farm, stock, and equipment. The family physician had, however, after long delay sent us a blood specimen and this we found to agglutinate *Br. melitensis* var. *abortus* in a serum dilution of 1:640. This young man came to the university hospital for further study. His cough persisted, and he had mucoid or mucopurulent sputum. Moist râles, diffusely scattered, were heard chiefly at the bases, posteriorly. The spleen was easily palpable. X ray of the chest was entirely negative. The patient looked well, and after a short rest in bed felt so well that he could not be persuaded to remain in the hospital.

The prominent features of this case are the symptoms and findings of pulmonary tuberculosis, but the rigors, pain in the back of the neck, and the palpable spleen make such a clinical diagnosis questionable. The course of the infection supports the diagnosis indicated by the laboratory findings.

Case 3 C.—M. F., male, aged 40, preacher. The patient became suddenly ill, feeling weak and somewhat feverish. His temperature was taken and found to be elevated and a physician was called. Early in the infection a rigor occurred, and from the first he had a cough. Only later did general aching appear. Sweating was never marked. Physical examination at first was essentially negative. A few days later, auscultation revealed moist râles over the bases, posteriorly. His physician detected slight dullness on percussion, and a suggestion of bronchial breathing. Pneumonia was suspected. Considering undulant fever also, blood was sent to the laboratory and the first specimen agglutinated *Br. melitensis* var. *abortus* in a 1:640 dilution; the second, four weeks later, in 1:5120 dilution. Two blood cultures remained sterile, but by guinea pig inoculation *Br. melitensis* var. *suis* was isolated from the feces.

Case 4 C.—O. I., male, aged 35, farmer. The onset was sudden, with headache, followed by a rapid rise in temperature. The prominent symptoms at first were occipital headache and severe pain in the back of the neck, particularly on the right side and associated with some local muscular twitching. Because of the acute pain, patient was unable to sleep. He had almost complete anorexia. His early temperature was high and sustained; later it was remittent. Meningitis was suspected, and he was admitted to hospital. Spinal fluid showed eight cells per cubic millimeter. The white blood count was 13,000, with an increase in the polymorphonuclears. The liver was found to be enlarged, and the spleen easily palpable. Less than a week later very profuse night sweats appeared, and the white blood cell count returned to normal. The total duration of illness was less than four weeks. During the course of the disease two agglutination tests showed titers for *Br. melitensis* var. *abortus* of 1:320 and 1:640, while early in convalescence the titer had decreased to 1:160.

Case 5 C.—M. P., male, aged 53, farmer. This patient applied to his physician, complaining of frequency of urination and pain in urinating. During the 10 days in which this condition persisted he was treated as a case of cystitis. Later inquiry revealed that for more than three months he had been ailing, having noted progressively increasing weakness, aching particularly in the legs and loss of weight. His later course was that of an intermittent type of undulant fever, but he did have an orchitis and epididymitis as a complication. The diagnosis of *Brucella* infection was supported by laboratory findings, since on two occasions his blood serum showed specific agglutination in 1:320 dilution.

Case 6 C.—T. D. T., male, aged 39, farmer. This patient applied for medical treatment, complaining of pain in the back, which was most severe on first motion

after a period of rest. He complained of pain in one ankle. He was treated for "rheumatism." Later inquiry obtained a history of moderate weakness, irregular but profuse night sweats, and some headache. During the patient's illness his daughter developed fever, and only after her case had been diagnosed as undulant fever was the father suspected of having the same ailment. This suspicion was confirmed by laboratory tests, his blood serum agglutinating *Br. melitensis* var. *abortus* in 1:1280 dilution.

Case 7 C.—B. L., male, aged 36, farmer. Patient first presented himself having as his only complaint swollen and painful testes. In spite of a negative history, a gonorrheal epididymitis was diagnosed. A detailed history later revealed that for four months prior to the onset of this symptom he had had an increasing lassitude and weakness. Subsequently the sweating characteristic of undulant fever developed, and this led to the correct diagnosis. Two tests on the blood serum were made showing agglutination for *Br. melitensis* var. *abortus* in titers of 1:640 and 1:1280, respectively. In addition, an organism of the *suis* variety was isolated from the blood stream.

Case 8 C.—P. T., male, aged 12, schoolboy. One evening this lad came home from school with headache and no appetite. The parents noticed on this same evening that he had a slight, right-sided limp. On the two following days he went to school, but the same symptoms appeared in the afternoon. On the fourth day he had a rigor, then felt chilly all through the night, and the next day he complained of pain and tenderness in the right loin. He was taken to an osteopath who found a temperature of 103.8°, and an apparently weak right leg. These symptoms in a patient who had headache, and felt generally ill, led to a diagnosis of anterior poliomyelitis, and the patient was quarantined. The fever subsided after about one week; following a few days of normal temperature, it gradually returned, and with it the same type of pain in the right hip. The boy was then taken to another hospital for surgical consultation, where osteomyelitis of the pelvis was considered in view of the localized pain and tenderness. An operation was performed. A small amount of material, supposedly pus, was withdrawn by aspiration. A bacteriological report on this later revealed a contaminant only. An incision was made along the line of the needle puncture, but no abscess or abnormality of any kind was found. Previous and subsequent X-ray analyses of the pelvis were negative.

The material which drained from the wound consisted only of blood. For five days following the operation the boy had daily peaks of high fever. Then for five days his temperature was almost normal, and he went home feeling much better. Three days later, however, a physican was called because of suspected fever, and found the boy's temperature was 101°. The fever persisted, and there continued to be a gradual loss of weight. The pain over the hip also returned, so the family physician reopened the wound, and a drachm of pus was removed. One month after his discharge from hospital he was again readmitted for X-ray and blood tests. At this time a positive agglutination of *Brucella* antigen in a serum dilution of 1:5120 was found. Blood culture also yielded *Br. melitensis* var. *suis*.

Case 9 C.—N. U., male, aged 27, farmer. A three months' illness before admission to hospital was fairly typical of undulant fever, and had been so diagnosed with confirmation from the laboratory. The serum was positive in dilution of 1:5120 and *Br. melitensis* var. *suis* was isolated by blood cultures. From the beginning, however, the patient experienced a dull ache in the abdomen, more prominent in the afternoon or evening when the fever was high. This pain was at the left of the mid line and in the lower part of the epigastrium. On one occasion during the stay in hospital the patient complained of a severe stabbing pain in the left lower quadrant. The area was tender to pressure, and the pain was increased

by movements of the left leg. A little later the pain appeared again, sharp, intermittent, and radiating toward the umbilicus. He was nauseated at the time and was unable to eat the following meal. Examination revealed a diffuse tenderness throughout the abdomen, but without localization or rigidity. There was no surgical intervention and the patient made an uneventful recovery.

Case 10 C.—E. A., male, aged 37, farmer. An early and accurate diagnosis of undulant fever was made in this case. The agglutination titer was 1:640. Here, also, an early and prominent complaint was abdominal pain. This was to the right and was severe, the patient stating that his "stomach was as tender as a boil." The patient felt hungry at times but was afraid to eat on account of the pain. Another time he suffered nausea and vomiting. The examination revealed a tense abdomen, with definite rigidity and marked tenderness, especially in the right upper quadrant. With convalescence from undulant fever this symptom disappeared.

D. FATAL CASES

Case 1 D.—H. G., male 21, packing-house employee. Our first contact with this patient was during a survey conducted in a packing plant for evidence of *Brucella* infection of the employees. At that time the patient considered himself well, but his serum agglutinated *Br. melitensis* var. *abortus* in the 1:2560 dilution. One month later (November 26, 1928) he stopped work and consulted his physician because of profound weakness. During December and January he passed through a moderately severe course of undulant fever, with the usual night sweats, anorexia, and restlessness, and in addition two attacks of anginal pain in the left chest, side, and arm (January 14, 1929, and January 24, 1929). In February, evidence of myocardial failure, but without constant signs of valvular lesions, appeared, and soon the patient died (February 21, 1929). Blood received on December 10, 1928, agglutinated *Br. melitensis* var. *abortus* in a serum dilution 1:2560. Culture medium, inoculated with blood and incubated four days, was sent to us, and from this *Br. melitensis* var. *suis* was isolated.

Three hours after death a necropsy was performed by Doctor Woodward of Mason City, and from him the following notes were obtained.

Height 5 feet 8 inches; weight 140 pounds.

Below the knees there was oedema.

The serous cavities contained clear fluid as follows: Abdominal, 2 liters; pleural, 1 liter on each side; pericardial, 300 cubic centimeters.

The lower lobe of right lung showed fibrous adhesions to the chest wall. There was marked anthracosis in lungs and bronchial lymph glands. The trachea and bronchi contained muco-purulent material.

The heart was hypertrophied to twice its usual size, and weighed 597 grams. When removing the heart, an abscess in the anterior mediastinum was opened. It was the size of a hen's egg and contained a bloody pus. The aorta had an erosion 1 centimeter in diameter and the anterior cusps were entirely destroyed. There was a mass 3 centimeters in diameter occupying the sinus behind the valve and connecting with the abscess in the mediastinum.

The liver was markedly enlarged and of the nutmeg type.

The spleen was enlarged, but on section no unusual pathological changes were noted. Other gross abnormalities were not noted.

From a culture of heart blood which was sent us, the *Br. melitensis* var. *suis* was isolated. The content of the abscess cavity was not examined culturally.

Portions of the various organs were preserved and also sent for examination. Sections were prepared and stained. One set was sent to the Hygienic Laboratory (now National Institute of Health), Washington, D. C., and the detailed report, made by Passed Assistant Surgeon R. D. Lillie, is presented here in full:

A. Pancreas.—Islets numerous and some quite large. No focal lesions.

B. Peribronchial lymph gland.—Moderate amount of coal pigment, marked reticuloendothelial hyperplasia, with relatively few free macrophages, some of which contain phagocytosed red corpuscles. Germinal centers are inconspicuous

FIGURE 23.—Lesions in the liver of a fatal case of undulant fever (H. G.) due to *Br. melitensis* var. *suis*

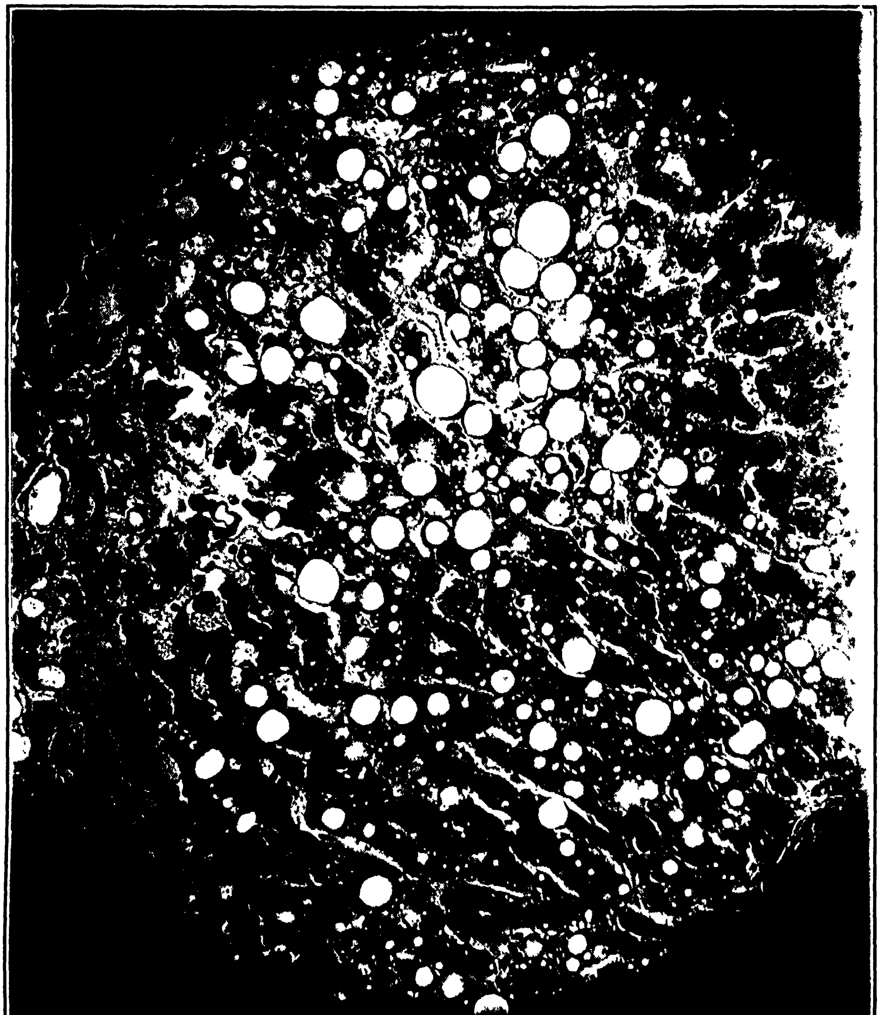

FIGURE 24.—Lesions in the liver of a fatal case of undulant fever (Mrs. H. B.)

and made up largely of small lymphoid cells. Moderate numbers of leucocytes seen among the reticulum cells.

C. Lymph gland.—Reticuloendothelial hyperplasia is even more marked, macrophages are more numerous and more of them contain red corpuscles. The swelling and vacuolation, close packing, and necrosis of these cells seen in typhoid are not noted here, and fixed reticuloendothelial cells greatly predominate.

D. Lymph gland.—Again even more marked hyperplasia of the reticuloendothelium along the course of the sinuses, with moderate numbers of lymphocytes, polymorphonuclears, and macrophages in the meshes of the fixed tissue cells. This gland lies in fatty tissue resembling mesentery.

E. Liver.—The portal areas are surrounded by zones of well-preserved liver cells. Around these occupying about the middle third of the lobules are zones of swollen liver cells with more eosinophilic vacuolated cytoplasm, the vacuoles being fine to medium in size. The centers of the lobules are occupied by a more or less confused mass of vacuolated oxyphil liver cells with karyolytic nuclei, or no nuclear staining whatever, between which are surviving endothelial nuclei, endothelial cells containing yellowish-brown granular pigment and not infrequently dilated blood-filled capillaries. The periportal connective tissue shows moderate lymphocyte infiltration.

H. Spleen.—The follicles are of moderate size. A few of these show centers of large swollen reticulum cells with cloudy-appearing oxyphil cytoplasm which appears very finely granular with a wide aperture immersion lens on oblique illumination. The pulp contains a considerable amount of blood, a few leucocytes and macrophages, and moderate numbers of lymphoid cells.

I. Kidney.—The glomeruli present *occasional* patches of swollen granular parietal capsular epithelium. The cortical convoluted tubules show granular oxyphil or finely reticular cytoplasm, often with distinct rodded border toward the lumen. Their lumina contain granular débris, irregular granular oxyphil masses, and some more compact hyaline castlike masses. The coarse limbs of Henle's loops show probably a little more cellular swelling and more débris in the lumen. The collecting tubules of the cortex and the medulla present relatively normal epithelium and contain frequent hyaline and less often granular, elongated, rather compact masses.

A small area in the pyramid shows centrally more or less broken down polymorphonuclear leucocytes, about this a zone of mixed polymorphonuclear and large rounded or stellate cells with large vesicular leptochromatic nuclei and rather broad lightly eosinophil cytoplasm. The last grade over into fibro blasts toward the periphery. Here considerable numbers of lymphocytes are seen and the whole lesion is surrounded by a zone of intense congestion and interstitial hemorrhage.

Anatomical findings: Reticuloendothelial hyperplasia of lymph glands. Centro-lobular necrosis and degeneration of liver. Nephrosis, acute toxic.

Case 2 D.—Mrs. H. B., female, aged 57, housewife. There were in the past, present, or family history no significant data. When seen June 20, 1928, the following history was obtained: Patient last felt well in December, 1927, but from that date she noted weakness which progressively became more severe. In January, 1928, she was in bed for one week with a febrile illness considered by her to be "flu." Recovery from this was slow and incomplete. Through February and March she continued with her housework, but complained of general aching and weakness. From April 1 the symptoms were moderately severe, though she did not become bedfast until June 1. Her symptoms were weakness, progressively increasing, and spells of chilliness, particularly in the afternoon, so severe that she would go to bed with a hot soapstone and would still be cold. Several rigors occurred. She sweat profusely, usually after midnight, the bed linen becoming "wet clear to the mattress." General aching, varying in severity, mild headache, backache, marked anorexia, with distressing and persistent nausea and occasional vomiting, occurred. The latter was the prominent symptom throughout the last part of her illness. There was a hacking cough, with glairy mucoid sputum and loss of weight, estimated at 40 pounds in a woman weighing normally 180 pounds. The temperature during June was remitting in character, rarely above 102° F.

Physical examination.—The striking feature was the weakness of the patient, who readily became exhausted by talking. A few fine râles were heard scattered over the lung bases posteriorly. The heart had a rate of 80, and the sounds were of good quality. The spleen or liver could not be palpated. Superficial glands showed no enlargement.

The later course of this illness showed no new features. The nausea and vomiting could not be controlled; the patient progressively became worse and died August 15, 1928.

During June and July three blood specimens were received and *Br. melitensis* var. *abortus* was agglutinated twice in 1:640 dilution and once in 1:1,280. No hemo-cultures were taken.

The urine was found to contain a small number of pus cells and some albumen.

A partial necropsy was allowed, and this was performed by Doctor Nyquist of Eldora. He reported that the striking feature was the complete absence of any notable gross pathological changes in the organs of the abdominal and chest cavities. This we confirmed by an examination in the gross of the organs sent for study.

Sections were prepared and, for confirmation of our observations, were also sent to the Hygienic Laboratory (now National Institute of Health) at Washington, D. C. Their report in part follows (findings by Passed Assistant Surgeon R. D. Lillie):

A. Small intestine.—Moderate postmortem autolysis of mucosa.

B. Pancreas.—Patchy interstitial fibrosis with areas of infiltration chiefly with lymphocytes, and a few plasma cells and macrophages; chronic interstitial pancreatitis.

C. Spleen.—Pulp spaces with contents largely laked blood. Moderate numbers of free large mononuclear cells in sinuses. Follicles small, made up largely of small lymphoid cells. No focal lesions.

D. Muscle.—Plainly striated, much interstitial fat.

E. Gall bladder.—Mucosa autolyzed; stroma shows patches of infiltration with lymphocytes and in places plasma cells. The serosal layer appears thickened and fibrous.

F. Duodenum.—No focal lesions nor ulceration. Mucosa shows autolysis of villus epithelium and many lymphoid cells in the stroma.

G. Lung.—New small patches of scarring and coal pigmentation.

H. Heart.—Considerable epicardial fat. Fibers show moderate lipochrome pigmentation at the poles of the nuclei, clear-cut cross striation, well defined fibrillae, and a moderate amount of transverse fragmentation.

I. Fat tissue.—

J. Liver.—The centers of the lobules show dilated capillaries filled with laked blood, between which are compressed liver cells distended by large vacuoles. This zone is often surrounded by a zone of much distended, coarsely vacuolated liver cells. This vacuolation is probably due to fatty infiltration. There are no focal necroses. The periportal connective tissue contains a moderate number of lymphocytes.

K. Colon.—No ulcers nor focal lesions. Moderate autolysis of mucosa.

L. Kidney.—Considering the degree of autolysis in other tissue and the hemolysis of the blood in the kidney capillaries, the convoluted tubules appear very well preserved. Lesions of the glomeruli or vessels are not noted.

Anatomical findings.—Chronic interstitial pancreatitis; chronic cholecystitis; fatty infiltration of liver; passive congestion of liver; fragmentary myocardial degeneration.

"Without knowledge of the bacteriological, clinical, serological and gross anatomical findings we hesitate to make an interpretation of the findings in these two cases. The presumed fatty infiltration or degeneration in the centers of the liver lobules in the two cases rests purely on morphology, the ordinary microchemical methods not being applicable, as the material is already stained and mounted in balsam."

Case 3 D.—H. L., male, aged 40, farmer. Prior to May, 1928, the patient had enjoyed good health. During that month he had a mild febrile illness regarded as "flu" with general aching and chilliness. During June he improved,

but dating from July 4 he noted an increasing weakness, which caused inability to do his usual work, spells of chilliness in the evening, and night sweats. During July and August he was ambulatory, worked intermittently even though he suffered as a result, and felt fairly well during the days of inactivity. His physician was first consulted about September 1, and at that time his complaint was "my kidneys are not working right." For only two days he had a scant flow with pain on micturition, but because of these symptoms he desired medical advice. During most of September he was in bed; from October 10 to 19 he was in the hospital for observation and diagnosis, and on November 29 he died suddenly. During this period the same symptoms prevailed. There was a moderate to marked weakness. The spells of chilliness did not occur while the patient was in bed, but he did have four or five rigors. The night sweats continued, though they became less profuse late in the disease. The only pain of which he complained was in the chest, bilateral, with radiation to left shoulder and arm. This was not severe and disappeared with rest in bed. While ambulatory he had moderate anorexia, but the appetite returned in September and continued to be good. Constipation was also severe for the same period, but later was less marked. There was a hacking cough. Insomnia occurred, though other nervous disturbances were not noted. A loss of 40 pounds in weight occurred chiefly during the ambulatory period. Doctor Kriebs reported that during the last month of patient's illness, when asked how he was feeling he invariably replied: "Fine; I feel like getting up and going to work."

The hospital record contained the following notes concerning physical findings: Patient looks and feels well. There is a rough systolic murmur over the whole precordium; there are also mitral and pulmonary diastolic murmurs. Röntgenogram showed only a slight enlargement of the heart and no evidence of pericardial effusion. "Clinically, he has plastic pericarditis with slight effusion and dilatation." Two blood counts showed 5,900 and 6,800 white blood cells, respectively, with 65 per cent polymorphonuclears on one count only. On a later examination in addition to the above signs it was found that the spleen was easily palpated. During October, at two different times blood was drawn for the agglutination test and for culture. *Br. melitensis* var. *abortus* was agglutinated in titers of 1:1,280 and 1:2,560, respectively, and from both samples *Br. melitensis* var. *suis* was isolated.

While in the hospital the temperature was irregular and remitting, never as high as 102° F., and rarely ever above 101° F. The pulse was rapid, usually between 100 and 120. During the following month both temperature and pulse definitely decreased.

The added features of the last two weeks of illness were three attacks of dyspnea, the last with a marked increase in pulse rate. For the following five days the pulse remained high, and the cardiac dullness increased. Suddenly, on November 29, when drinking a glass of milk, he collapsed and died.

Though necropsy was not allowed, the clinical evidence of diffuse cardiac disease, involving the pericardium, myocardium, and endocardium, was very definite.

The clinical, serological, and bacteriological findings allow the acceptance of *Br. melitensis* var. *suis* as the etiological agent in this infection.

An examination of the livestock on the farm revealed no infected cattle but showed four serologically positive sows.

Case 4 D.—W. B., male, aged 27, farmer. Prior to present illness the patient had enjoyed good health. Onset began insidiously about the end of March, 1929. He first noted that he readily became tired and drowsy and with difficulty continued his work. He remained ambulatory until early in June, but for most of the period could undertake no work. He was seen June 19, 1929,

at which time his symptoms were as follows: Marked weakness; rigors, nightly for two weeks; profuse night sweats; severe general aching; intermittent headache, worse during ambulatory period; mild lumbar backache, stiff neck—"required rubbing every night"; anorexia and constipation, with severe spells of nausea and vomiting; restlessness and irritability; for two weeks a severe cough, which persisted and became the prominent feature of the latter part of the disease.

We have no record of the physical findings.

Two blood specimens collected during June both agglutinated *Br. melitensis* var. *abortus* in a 1:320 dilution.

Br. melitensis var. *abortus* and *suis*, was isolated from the blood cultures. The fact that both porcine and bovine varieties were isolated was of particular interest.

Toward the end of July the symptoms and signs of lung abscess developed. Early in August an operation for drainage was performed. The patient gradually grew weaker and shortly afterwards died.

Whether one or both of the varieties of *Br. melitensis* found by culture were primarily involved in the production of this abscess, or whether the infection reduced the general and local resistance to other organisms which brought about the tissue destruction, can not be determined.

Case 5 D.—R. B., male, aged 29. Stock buyer, purchasing and handling only hogs. From about January 24, 1929, he complained frequently of chilliness. From February 6 he had an attack of "flu" which confined him to bed for two days. Though still ill he returned to work after four days but on February 13 he came home, admitting he was sick, went to bed, and died one month later.

His symptoms during this period were as follows: Marked prostration, severe and persisting frontal headache and backache, anorexia, constipation, restlessness, rapid loss of weight, and later delirium. He had two rigors. Night sweats were never profuse and were confined to the early period of his disease He had three convulsions shortly before death.

The physical examination was reported as essentially negative.

The temperature was high, with slight morning remissions. The pulse at first was relatively slow (80 to 100), but during the last week it was rapid and slightly irregular.

Albuminuria was noted late in the disease.

Three white blood counts between March 3, 1929, and March 12, 1929, were 4,150, 4,250, and 2,950. One differential showed polymorphonuclears 32 per cent, small lymphocytes 19 per cent, and large mononuclears 50 per cent.

On February 27, 1929, the blood serum agglutinated *Br. melitensis* var. *abortus* in the 1:1,280 dilution.

This case, therefore, was a malignant type of infection without signs of localization.

Case 6 D.—Mrs. C. H., female, aged 27, housewife. This patient had enjoyed exceptionally good health prior to the onset of the present illness. Her husband had suffered from a fever during January and February, 1927, which clinically had been diagnosed typhoid fever, but the characteristics were found to be those of undulant fever. Blood serum obtained during April agglutinated *Br. melitensis* var. *abortus* in the 1:100 dilution, but caused no agglutination of *B. typhosus* or *paratyphosus*. Throughout his illness he had been nursed by his wife. During his convalescence, on March 12, she suddenly became acutely ill. The evening meal had been enjoyed with friends, but shortly afterwards she was taken home to bed with severe headache, prostration, and fever. Before midnight the physician was called and a temperature between 103° and 104° was found. For 10 days the patient was cared for at home. Her complaints were

extreme weakness, marked general aching, spells of chilliness, complete anorexia with frequent nausea and occasional vomiting. On March 21, the 10th day of illness, the patient was admitted to the hospital. The physicians admission note was as follows: "The high temperature is not characteristic of influenza, but the absence of all symptoms and findings of typhoid make it the only diagnosis available at this time." There was no diarrhea, tympanites, or notable constipation, and the patient lacked the dull toxic appearance so characteristic of typhoid. During the subsequent course the patient was remarkably free from discomfort, complaining only of extreme exhaustion and feverishness. The temperature was sustained and continued to rise. The pulse became very rapid, but the respiration was never embarrassed.

Physical examination throughout was essentially negative. Late in the disease râles appeared. The spleen was not palpated.

The illness progressed, delirium and coma appeared, and there were involuntary passages of urine and feces. On the 21st day of the disease the patient died, with death attributed to a myocardial failure.

Blood smears were examined by us. There was obviously a marked leucopenia and the differential count showed polymorphonuclears, 21 per cent; small lymphocytes, 10 per cent; large mononuclears, 69 per cent.

Three blood specimens were sent for Widal tests, which were collected on the 11th, 15th, and 19th days of the disease. The first two were dried specimens, the last whole wet blood. The first specimen showed no agglutination of *Br. melitensis* var. *abortus*, the second showed microscopically some clumping in the 1:40 and 1:80 dilutions, while the third showed complete agglutination in the 1:80 serum dilution. This evidence of increasing agglutinins gives strong evidence of the specific nature of the infection, even though the final titer is not high.

The temperature chart of this case is shown as the first of the two malignant types illustrated (fig. 22).

No postmortem examination was allowed.

There is here clinical evidence of an overwhelming septicemia, with no evidence of any localization.

The possible source of this infection gives added interest to this case. The family used pasteurized milk. The husband was frequently away and acquired his infection from some undetermined source; while the wife, as the nurse, may have acquired her infection from the excreta of her husband.

Case 7 D.—E. B., male, aged 22, farmer. The patient first consulted his physician August 15, 1927, and stated that he had not been well for one month. He was weak, had no appetite, and had had spells of chilliness and fever. He also complained of abdominal pain in the right lower quadrant. From that time the patient was acutely ill. He was observed and treated in the hospital for the first two weeks of September, but died at home on September 23. He was dull and early in the disease had delirium. There was profuse perspiration and constipation. The patient's chief complaint was arthralgia involving chiefly the toes, ankles, knees, and elbows. There was local tenderness but no swelling. During the last week he complained of epigastric pain, and tenderness was noted. Throughout, an unusual and prominent symptom was deafness.

The spleen was not palpable.

The temperature was irregularly remitting, having a daily maximum of 103° F., but rarely reaching 104° F. or higher late in the disease.

There was a marked leukopenia, the white blood count on two occasions being 2,150.

Widal tests were repeatedly negative. The first blood specimen received by us was dried, and agglutination of *Br. melitensis* var. *abortus* was found. Blood for a microscopic test was later received, and we reported agglutination

positive in the 1:320 dilution. As this was one of our earlier cases, the blood was also sent to the Hygienic Laboratory (now National Institute of Health), Washington, D. C., and there a titer of 1:640 was found.

Case 8 D.—L. J. H., male, aged 52, farmer. The past, present, and family history is irrelevant. There was a gradual onset about September 20, 1928, spells of chilliness being his first complaint. On October 10 he was admitted to the hospital at which time the prominent features of his disease were stated to be "chills" and sweats. These had persisted for three weeks and the chills were true rigors. He perspired after his chills, and "in the evening after going to sleep, wakened, drenched with sweat." Slight general aching, mild headache, listlessness, and drowsiness are mentioned.

Physical examination notes are confined chiefly to the cardio-vascular system. On October 18, 1928, an aortic diastolic murmur was first heard. This persisted and became more marked. Blood pressure on admission October 10, 1928, was 104/64, and on October 21, 1928, it was 88/30. On October 31, 1928, there was numbness and weakness of the entire right leg, which was attributed to an embolism. Condition progressively became worse and patient died November 11, 1928.

The temperature was of a septic type, 99° to 100° F. in the morning and in the evening 104° or higher. The day before death it reached 106.4°.

There was a moderate tachychardia.

Two blood cultures, incubated for only 72 hours, showed no growth.

Two agglutination tests gave titers for *Br. melitensis* var. *abortus*, as follows: October 15, 1928, 1:20; October 25, 1928, 1:80.

It is our opinion that this patient died of a malignant endocarditis due to *Brucella* infection.

Case 9 D.—A., male, aged 29, laborer. The patient, a very poor Mexican, spoke no English, lived alone, and was practically unattended throughout his illness. The physician, moreover, was called late and infrequently. Data are therefore meager. As far as is known the duration of illness was three weeks. The nature of onset could not be determined. He had true rigors and excessive sweating. There was headache, backache, and pain in the back of the neck. Patient was very restless, had marked insomnia and "was much worse at night." Until late in the illness he could not be kept in bed. He had a moderate cough, and some sputum in which tubercle bacilli could not be found. Just before death there was delirium, some cyanosis, and rapid respiration.

The attending physician and a consultant found, late in the disease, "evidence of capillary bronchitis" and an enlarged spleen. The temperature was taken only occasionally, but there was clearly a high fever. One serum specimen, sent to us from the local laboratory, showed agglutination of *Br. melitensis* var. *abortus* in 1:2,560 dilution.

Miliary tuberculosis was carefully considered as a diagnosis, but the illness and death was attributed to undulant fever. This opinion seems justified.

Case 10 D.—Mrs. D. B., female, aged 55, farmer's wife. Illness began the last week of November, 1928. She first noted burning and smarting on urination. This continued until December 10, at which time the patient first complained of feverishness. She was also "nervous and uneasy" and distressed by sleeplessness. At about this date diarrhea commenced and nausea and vomiting became prominent. Weakness became more and more marked. There was also severe aching, worse in the joints, causing the patient to state she "had rheumatism." On December 24 she was admitted to the hospital. In the nurses' daily record it is stated that "she is continually soaked in perspiration." This symptom is not mentioned after January 1. She continued to be distressed by diarrhea, nausea, and vomiting. There was severe headache which persisted.

The weakness rapidly increased. The patient became irrational and died February 9. Emaciation at the last was extreme, the total loss of weight estimated at 75 pounds. The pulse became rapid and weak, and death was attributed to exhaustion.

The temperature chart during the period of hospitalization showed only a low grade fever, higher during the first two weeks, but even then it rarely reached 102°.

The physical examination was reported essentially negative, a fiery red, dry tongue alone being emphasized.

The white blood counts were high. Three examinations while in the hospital (date unrecorded) were 15,000; 11,000, and 7,000, with corresponding polymorphonuclears of 93 per cent, 78 per cent, and 55 per cent.

The urine examination was stated to be negative. There were no notes concerning the character of the stools.

Blood serum agglutinated *Br. melitensis* var. *abortus* as follows: December 29, 1:640; January 10, 1:320.

Blood cultures were not obtained and necropsy was not allowed.

Whether *Brucella* infection of an unusual type caused the patient's death or whether it was an incidental intercurrent infection remains undetermined.

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DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for August, 1930

The accompanying table, taken from the Statistical Bulletin for September, 1930, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for August, 1930, as compared with that for the preceding month and for the corresponding month of last year. It also gives the cumulative rates for the period January–August for the years 1930 and 1929. These rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada.

Thus far in 1930 only one month (July) has registered a higher death rate among this group than did the corresponding month last year. The mortality rate in August was 7.5 per 1,000, as compared with 7.7 last year, and the cumulative rate for the eight elapsed months was only 8.9 per 1,000, as against 9.9 in 1929—a reduction of 10 per cent. Among the policyholders living west of the Rocky Mountains, the August death rate was 5.9 per 1,000, as compared with 6.1 last year; in the remainder of the United States this year's figure was 7.6, as compared with 7.8; while among Canadian policyholders, the corresponding figures were 8 and 8.1.[1]

Tuberculosis, diphtheria, and puerperal diseases continue to be the outstandingly favorable items in what bids fair to be the best health year of all time. The tuberculosis death rate for the eight elapsed months was more than 9 per cent below that for the like period of last year, the previous minimum. The diph-

[1] These rates apply to a more or less selected group of persons. In recent years the general annual death rate in this group has been approximately 73 per cent of the rate for the registration area of the United States.—*Ed.*

theria rate has declined 28 per cent and that for maternal diseases over 11 per cent in a single year.

With two-thirds of 1930 already past, the cancer death rate is 76.1 per 100,000, as compared with 77.5 for the like part of 1929. There is now a very good prospect that the almost continuous rise in the mortality from malignant growths will be broken this year. While this is an encouraging development, too much significance must not be attached to it. If, however, 1931 shows a further drop, there will be good grounds for the hope that the rise in cancer mortality is destined to be checked. Pneumonia, heart disease, Bright's disease, and, more particularly, influenza, are other important diseases which have recorded much lower mortality rates than in 1929. Slight improvement is also in evidence for diabetes and diarrheal complaints.

Death rates (annual basis) per 100,000 for principal causes of death, August, 1930

[Industrial department, Metropolitan Life Insurance Co.]

Cause of death	Rate per 100,000 lives exposed [1]				
	August, 1930	July, 1930	August, 1929	Cumulative, January-August	
				1930	1929
Total, all causes	751.3	813.7	767.7	892.1	987.5
Typhoid fever	3.2	2.6	3.3	1.7	2.1
Measles	.6	2.3	1.6	3.8	4.0
Scarlet fever	1.1	1.8	1.1	2.9	3.0
Whooping cough	5.4	4.9	6.4	4.7	6.4
Diphtheria	3.0	4.3	4.0	6.2	8.6
Influenza	3.3	4.2	3.9	16.7	55.8
Tuberculosis (all forms)	71.6	85.0	78.6	83.7	92.1
Tuberculosis of respiratory system	62.3	74.4	70.1	72.7	81.6
Cancer	73.6	79.3	72.6	76.1	77.5
Diabetes mellitus	16.1	16.7	14.4	18.8	19.5
Cerebral hemorrhage	53.7	60.2	[2] 46.4	60.8	[2] 59.3
Organic diseases of heart	112.7	133.7	117.0	148.0	154.7
Pneumonia (all forms)	29.4	39.2	34.4	84.4	103.5
Other respiratory diseases	8.3	10.2	9.2	11.7	13.1
Diarrhea and enteritis	32.2	22.9	31.5	16.3	17.4
Bright's disease (chronic nephritis)	58.6	66.9	59.9	69.0	72.0
Puerperal state	10.8	11.4	11.7	12.5	14.1
Suicides	9.3	9.3	7.1	9.5	8.6
Homicides	6.3	7.8	6.6	6.4	6.4
Other external causes (excluding suicides and homicides)	75.6	80.1	71.6	62.5	64.0
Traumatism by automobiles	22.4	22.2	22.5	19.2	18.6
All other causes	176.7	200.9	186.6	196.1	205.4

[1] All figures in this table include insured infants under 1 year of age. The rates for 1930 are subject to slight correction, as they are based on provisional estimates of lives exposed to risk.
[2] Rate not comparable with that for 1930.

DEATHS DURING WEEK ENDED SEPTEMBER 27, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended September 27, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Sept. 27, 1930	Corresponding week, 1929
Policies in force	75, 495, 053	74, 762, 355
Number of death claims	12, 170	12, 587
Death claims per 1,000 policies in force, annual rate	8.4	8.8

Deaths[1] *from all causes in certain large cities of the United States during the week ended September 27, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)*

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Sept. 27, 1930				Corresponding week 1929		Death rate [2] for first 39 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (77 cities)	6,879	10.5	762	[4] 61	11.1	769	12.1	12.9
Akron	40	8.2	4	87	9.3	4	7.9	9.5
Albany [5]	40	16.3	2	41	19.0	4	15.0	16.5
Atlanta	63	12.3	6	61	16.3	12	16.0	16.2
White	31		6	95		6		
Colored	32	(6)	0	0	(6)	6	(6)	(6)
Baltimore [5]	178	11.6	28	97	13.2	24	14.1	14.9
White	126		21	93		17		
Colored	52	(6)	7	112	(6)	7	(6)	(6)
Birmingham	62	12.5	7	67	12.0	7	13.9	16.4
White	26		3	48		3		
Colored	36	(6)	4	98	(6)	4	(6)	(6)
Boston	180	12.0	23	67	13.2	26	14.2	15.3
Bridgeport	24	8.5	4	68	9.9	4	11.1	12.3
Buffalo	122	11.1	14	62	14.7	15	13.1	14.2
Cambridge	20	9.2	3	60	12.0	4	11.7	12.7
Camden	30	13.3	1	18	14.2	6	13.9	14.7
Canton	18	8.9	4	107	8.5	5	10.0	11.4
Chicago [5]	666	10.2	64	57	10.0	64	10.5	11.4
Cincinnati	148	17.1	12	71	16.0	21	15.8	17.3
Cleveland	164	9.5	23	69	10.0	13	11.2	12.7
Columbus	77	13.8	9	89	11.1	7	15.8	15.1
Dallas	45	8.9	10		10.1	7	11.6	11.7
White	33		9			5		
Colored	12	(6)	1		(6)	2	(6)	(6)
Dayton	50	12.9	6	90	13.2	7	10.7	11.6
Denver	77	13.9	13	142	10.6	2	14.9	15.0
Des Moines	24	8.8	6	111	12.2	2	11.8	11.8
Detroit	218	7.2	33	51	10.2	44	9.4	11.4
Duluth	26	13.4	2	54	11.9	3	11.3	11.7
El Paso	27	13.7	6		13.5	10	17.7	20.2
Erie	17	7.6	3	66	9.5	1	11.3	12.6
Fall River [5] [7]	27	12.3	8	185	8.6	1	12.2	14.1
Flint	35	11.6	11	130	12.0	11	9.3	10.9
Fort Worth	29	9.4	1		8.9	5	11.3	12.7
White	24		1			3		
Colored	5	(6)	0		(6)	2	(6)	(6)
Grand Rapids	37	11.4	6	90	12.2	3	10.5	10.3
Houston	67	11.9	12		11.7	4	12.4	12.8
White	44		7			2		
Colored	23	(6)	5		(6)	2	(6)	(6)
Indianapolis	118	16.8	16	120	14.5	13	14.8	14.9
White	97		13	112		9		
Colored	21	(6)	3	175	(6)	4	(6)	(6)
Jersey City	45	7.4	4	35	15.1	8	11.4	12.8
Kansas City, Kans	34	14.5	2	47	11.1	1	11.6	13.4
White	25		1	28		1		
Colored	9	(6)	1	152	(6)	0	(6)	(6)
Kansas City, Mo	97	12.8	9	75	12.6	5	13.6	14.2
Knoxville	15	7.3	4	94	12.1	1	13.8	14.0
White	13		4	104		0		
Colored	2	(6)	0	0	(6)	1	(6)	(6)
Los Angeles	242	10.1	23	70	9.2	11	11.1	11.5
Lowell [7]	21	10.9	2	53	13.4	3	13.5	14.4
Lynn	9	4.6	0	0	12.3	0	10.5	11.5
Memphis	50	10.3	8	94	14.8	3	17.5	19.4
White	28		4	72		1		
Colored	22	(6)	4	135	(6)	2	(6)	(6)
Milwaukee	101	9.2	11	48	10.5	17	9.8	11.2
Minneapolis	87	9.8	5	33	10.5	4	10.7	11.0
Nashville	50	17.7	6	94	15.6	4	17.5	19.1
White	33		4	84		4		
Colored	17	(6)	2	124	(6)	0	(6)	(6)
New Bedford [7]	27	12.5	5	128	10.1	3	10.9	12.5

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended September 27, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Sept. 27, 1930				Corresponding week 1929		Death rate [2] for first 39 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
New Haven	10	3.2	0	0	12.5	2	12.8	13.4
New Orleans	144	16.4	16	89	16.8	17	17.6	17.8
White	87	------	10	85	------	8	------	------
Colored	57	(6)	6	97	(6)	9	(6)	(6)
New York	1,192	8.9	110	46	9.3	137	10.9	11.5
Bronx Borough	172	7.0	11	32	7.6	13	8.0	8.3
Brooklyn Borough	389	7.8	32	34	8.1	45	9.8	10.4
Manhattan Borough	472	13.3	51	65	13.8	67	16.3	16.7
Queens Borough	126	6.0	14	56	5.5	8	7.1	7.7
Richmond Borough	33	10.9	2	39	15.2	4	14.5	16.2
Newark, N. J	86	10.1	11	58	10.5	16	12.1	13.0
Oakland	54	9.8	1	12	9.1	4	11.0	11.5
Oklahoma City	12	3.4	4	72	8.3	7	10.7	10.8
Omaha	34	8.3	5	61	13.7	1	13.6	13.9
Paterson	26	9.8	2	35	10.2	4	12.3	13.6
Philadelphia	426	11.3	61	91	10.8	50	12.7	13.3
Pittsburgh	177	13.8	18	64	15.2	29	13.9	15.0
Porland, Oreg	49	8.5	5	62	12.3	0	12.3	12.9
Providence	46	9.5	5	46	13.1	5	13.2	14.8
Richmond	39	11.1	4	58	17.2	5	15.0	16.5
White	20	------	2	44	------	1	------	------
Colored	19	(6)	2	85	(6)	4	(6)	(6)
Rochester	68	10.9	4	36	10.3	8	11.7	12.6
St. Louis	204	12.9	25	87	12.4	7	14.3	14.9
St. Paul	40	7.7	4	40	8.6	4	10.1	10.6
Salt Lake City [5]	15	5.6	0	0	10.2	4	12.3	13.1
San Antonio	47	9.5	8	------	11.2	7	15.4	14.7
San Diego	40	11.0	1	21	13.1	4	14.5	15.3
San Francisco	165	13.7	8	54	12.3	2	13.3	13.3
Schenectady	20	10.9	1	31	10.4	2	11.4	12.5
Seattle	58	8.3	4	40	9.7	4	11.0	11.1
Somerville	15	7.5	1	32	11.7	0	9.8	9.4
Spokane	24	10.8	1	26	10.4	0	12.3	13.0
Springfield, Mass	33	11.4	1	17	12.7	5	12.2	13.0
Syracuse	36	9.0	5	62	10.4	5	11.7	13.4
Tacoma	19	9.3	0	0	10.3	1	12.5	11.8
Toledo	74	13.2	2	18	13.2	13	12.7	13.8
Trenton	29	12.3	5	96	15.3	1	16.8	17.3
Utica	24	12.2	3	83	17.3	8	14.8	15.7
Washington, D. C	127	13.6	16	94	12.7	10	15.2	15.5
White	76	------	3	26	------	6	------	------
Colored	51	(6)	13	232	(6)	4	(6)	(6)
Waterbury	14	7.2	1	24	6.2	4	9.7	9.5
Wilmington, Del. [7]	39	19.4	5	121	11.4	5	14.8	14.1
Worcester	35	9.3	2	28	8.8	1	12.8	12.8
Yonkers	16	6.1	0	0	9.4	2	8.1	9.4
Youngstown	35	10.7	7	100	10.5	6	10.3	12.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 72 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended October 4, 1930, and October 5, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 4, 1930, and October 5, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929
New England States:								
Maine	2	3	1		8	1	0	0
New Hampshire	1	4		3		8	0	0
Vermont		4			1		0	0
Massachusetts	38	75	1	2	54	29	5	2
Rhode Island	4	5				2	1	0
Connecticut	7	14	8	2	2	4	2	0
Middle Atlantic States:								
New York	60	113	[1] 3	[1] 1	41	81	8	12
New Jersey	79	79	1	4	25	8	2	2
Pennsylvania	121	167			49	75	5	11
East North Central States:								
Ohio	48	68	2	11	12	59	3	2
Indiana	63	44	16		5	10	5	0
Illinois	118	165	18	10	34	62	9	7
Michigan	43	77		3	11	83	0	20
Wisconsin	1	23	10	23	36	89	3	4
West North Central States:								
Minnesota	17	17	1	3	1	25	3	0
Iowa	3	7				2	1	2
Missouri	30	39	1	1	34	20	3	8
North Dakota	3	9			18	2	0	2
South Dakota	5	7			1	2	0	1
Nebraska	10	19				11	2	1
Kansas	9	28		2	3	10	2	0
South Atlantic States:								
Delaware	1	3			4	1	0	0
Maryland [2]	11	16	1	3	4	1	0	2
District of Columbia	9	12		2	3	4	0	0
Virginia								
West Virginia	21	38	5	1	17	12	0	0
North Carolina	129	229	5		5	4	1	2
South Carolina	38	63	187	316			0	0
Georgia	22	22	20	42	23	3	1	0
Florida	4	9		2	2	3	0	0
East South Central States:								
Kentucky	28	24					7	1
Tennessee	36	30	2	16	7	1	0	1
Alabama	43	44	22	7	22		1	1
Mississippi	40	54					1	2

[1] New York City only. [2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 4, 1930, and October 5, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929
West South Central States:								
Arkansas	3	25	5	29	1	2	0	0
Louisiana	24	22	4	5	3	1	0	2
Oklahoma [3]	38	75	6	33	7	29	0	1
Texas	41	57	11	28	2	2	0	0
Mountain States:								
Montana	4					81	0	0
Idaho	1				7	4	0	0
Wyoming	1	2					0	1
Colorado	5	8			65	3	2	2
New Mexico	5	10					2	0
Arizona	6	4	2		12	1	1	0
Utah [1]		2	5	6	1	3	4	2
Pacific States:								
Washington	12	11		2	11	3	1	5
Oregon	2	8	15	12	45	9	1	0
California	39	40	31	24	67	43	1	7

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929
New England States:								
Maine	9	1	12	12	0	0	8	1
New Hampshire	1	0	0	12	0	0	2	0
Vermont	1	0	0	1	0	0	0	0
Massachusetts	38	4	67	103	0	0	8	5
Rhode Island	2	1	4	5	0	0	1	3
Connecticut	10	1	16	14	0	0	4	10
Middle Atlantic States:								
New York	50	34	100	81	0	5	86	44
New Jersey	3	4	47	44	0	0	12	5
Pennsylvania	15	14	151	166	0	0	43	94
East North Central States:								
Ohio	75	12	162	125	36	27	95	41
Indiana	17	0	72	59	18	21	20	13
Illinois	23	2	108	229	7	46	38	31
Michigan	20	11	90	144	2	18	27	15
Wisconsin	14	0	54	61	4	2	7	17
West North Central States:								
Minnesota	17	0	28	55	19	1	0	0
Iowa	25	6	36	35	12	10	4	4
Missouri	18	0	28	42	0	12	25	13
North Dakota	3	2	7	8	6	3	6	4
South Dakota	14	0	3	7	6	19	2	2
Nebraska	60	0	13	15	5	6	3	0
Kansas	87	1	38	18	2	13	11	5
S uth Atlantic States:								
Delaware	0	0	0	2	0	0	3	3
Maryland [1]	2	2	24	35	0	0	35	30
District of Columbia	0	1	4	10	0	0	4	1
Virginia		21						
West Virginia	1	1	48	44	0	8	70	42
North Carolina	1	8	86	122	0	2	21	29
South Carolina	2	3	19	18	0	0	41	38
Georgia	3	1	27	38	0	0	32	18
Florida	2	1	2	6	1	0	1	3
East South Central States:								
Kentucky	2	0	51	28	0	0	40	22
Tennessee	1	2	49	43	0	1	55	32
Alabama	4	1	39	48	0	6	31	13
Mississippi	0	2	18	29	1	1	19	26
West South Central States:								
Arkansas	11	0	10	20	0	0	21	23
Louisiana	7	0	15	12	1	0	28	16
Oklahoma [3]	4	2	41	56	3	4	35	49
Texas	8	0	24	38	17	4	20	21

[1] Week ended Friday. [3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 4, 1930, and October 5, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929	Week ended Oct. 4, 1930	Week ended Oct. 5, 1929
Mountain States:								
Montana	2	0	13	8	0	7	8	53
Idaho	0	0	1	5	0	4	3	1
Wyoming	12	0	6	2	0	3	0	0
Colorado	5	1	16	12	3	15	8	10
New Mexico	2	0	6	6	0	1	14	16
Arizona	3	1	10	2	0	0	1	3
Utah [3]	0	0	11	14	0		7	2
Pacific States:								
Washington	3	1	33	35	22	19	11	8
Oregon	2	0	16	8	0	7	9	1
California	68	2	73	73	10	12	14	8

[3] Week ended Friday.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Cerebrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August, 1930										
Massachusetts	10	183	4	4	227	3	104	192	0	63
Montana	3	3	5		14	1	1	32	11	13
Texas	6	99	18	1,187		10	18	74		138
September, 1930										
Nebraska	4	14	2		18		72	47	45	17

August, 1930

	Cases
Actinomycosis:	
Massachusetts	1
Anthrax:	
Massachusetts	1
Chicken pox:	
Massachusetts	70
Montana	11
Dysentery:	
Massachusetts	5
German measles:	
Massachusetts	22
Mumps:	
Massachusetts	144
Montana	26
Ophthalmia neonatorum:	
Massachusetts	73
Septic sore throat:	
Massachusetts	9
Tetanus:	
Massachusetts	2
Trachoma:	
Massachusetts	1
Trichinosis:	
Massachusetts	2
Undulant fever:	
Montana	1
Whoping cough:	
Massachusetts	551
Montana	87

September, 1930

	Cases
Nebraska:	
Anthrax	1
Chicken pox	32
Mumps	12
Undulant fever	1
Whooping cough	55

Cases of Certain Communicable Diseases Reported for the Month of June, 1930, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	125	35	197	217	40	0	60	8	77
New Hampshire	-	3	-	-	18	0	-	0	-
Vermont	96	1	196	1	25	0	28	0	62
Massachusetts	876	203	4,227	454	603	0	523	17	773
Rhode Island	87	17	100	2	46	0	39	1	32
Connecticut	281	47	146	112	161	0	142	4	172
New York	1,894	478	8,618	1,498	1,069	30	1,877	71	1,445
New Jersey	613	341	4,268	-	467	0	481	23	316
Pennsylvania	1,323	345	3,984	924	973	0	583	65	857
Ohio	1,016	127	1,808	353	627	328	703	43	698
Indiana	179	43	530	11	260	440	261	28	148
Illinois	839	553	1,777	726	1,120	327	1,052	55	783
Michigan	742	259	3,514	565	918	230	311	21	1,004
Wisconsin	894	50	1,735	579	329	88	164	9	672
Minnesota	355	60	437	-	207	24	292	7	110
Iowa	74	18	360	44	111	427	35	10	58
Missouri	196	97	315	118	352	196	161	41	124
North Dakota	15	15	56	48	53	87	20	3	89
South Dakota	44	27	415	11	21	129	10	1	27
Nebraska	1[illegible]3	20	279	40	90	140	12	7	33
Kansas	178	43	839	211	123	298	136	29	338
Delaware	18	3	18	3	26	0	10	1	17
Maryland	312	57	138	60	188	0	248	28	195
District of Columbia	92	25	260	-	34	0	109	4	19
Virginia	305	58	1,259	-	72	6	167	137	751
West Virginia	60	23	199	-	72	38	40	36	154
North Carolina	228	42	268	-	63	44	-	134	1,201
South Carolina	209	67	140	87	14	7	151	244	400
Georgia	25	13	416	67	41	8	54	100	149
Florida	16	24	216	71	4	2	26	15	16
Kentucky [1]	-	-	-	-	-	-	-	-	-
Tennessee	83	23	349	32	100	49	[2] 143	119	122
Alabama	57	32	404	65	32	19	356	64	197
Mississippi	337	27	231	406	13	12	278	189	1,432
Arkansas	17	7	84	26	9	12	[2] 14	45	108
Louisiana	26	59	41	5	63	8	[2] 201	119	27
Oklahoma [3]	4	34	233	13	53	287	47	48	107
Texas	-	51	-	-	56	-	-	61	-
Montana	21	2	81	46	67	17	11	6	50
Idaho	75	5	46	22	13	24	10	2	73
Wyoming	7	5	184	11	9	48	[2] 1	1	9
Colorado	98	19	1,616	329	53	38	92	6	294
New Mexico	33	37	156	30	20	21	91	6	13
Arizona	27	4	228	45	13	11	148	24	54
Utah [1]	-	-	-	-	-	-	-	-	-
Nevada	-	-	14	12	-	16	[2] 2	-	-
Washington	179	15	1,876	292	63	139	142	17	255
Oregon	91	15	386	85	39	69	54	17	160
California	941	212	5,919	1,646	393	178	921	87	863

[1] Reports received weekly. [2] Pulmonary. [3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 1,000 Population (Annual Basis) for the Month of June, 1930

[The rates here given and those for previous months of 1930 have been calculated by use of approximated populations and may not be strictly comparable with similar rates for subsequent months of the year, which will be based on results of the 1930 census]

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	1.90	0.53	3.00	3.30	0.61	.00	0.91	0.12	1.17
New Hampshire	--------	.08	--------	--------	.48	.00	--------	.00	--------
Vermont	3.31	.03	6.77	.03	.86	.00	.97	.00	2.14
Massachusetts	2.43	.56	11.73	1.26	1.67	.00	1.45	.05	2.14
Rhode Island	1.43	.28	1.64	.03	.76	.00	.64	.02	.53
Connecticut	1.98	.33	1.03	.79	1.13	.00	1.00	.03	1.21
New York	1.95	.49	8.89	1.54	1.10	.03	1.94	.07	1.49
New Jersey	1.88	1.05	13.10	--------	1.43	.00	1.48	.07	.97
Pennsylvania	1.59	.42	4.80	1.11	1.17	.00	.70	.08	1.03
Ohio	1.75	.22	3.12	.61	1.08	.57	1.21	.07	1.20
Indiana	.67	.16	2.00	.04	.98	1.66	.98	.11	.56
Illinois	1.34	.89	2.85	1.16	1.79	.52	1.69	.09	1.25
Michigan	1.88	.66	8.92	1.43	2.33	.58	.79	.05	2.55
Wisconsin	3.60	.20	6.98	2.33	1.32	.35	.66	.04	2.70
Minnesota	1.55	.26	1.90	--------	.90	.10	1.27	.03	.48
Iowa	.37	.09	1.80	.22	.55	2.13	.17	.05	.29
Missouri	.67	.33	1.08	.40	1.21	.67	.55	.14	.43
North Dakota	.28	.28	1.06	.91	1.01	1.65	.38	.06	1.69
South Dakota	.74	.46	7.01	.19	.35	2.18	.17	.02	.46
Nebraska	.96	.17	2.37	.34	.76	1.19	.10	.06	.28
Kansas	1.17	.28	5.52	1.39	.81	1.96	.89	.19	2.22
Delaware	.89	.15	.89	.15	1.29	.00	.49	.05	.84
Maryland	2.30	.42	1.02	.44	1.38	.00	1.82	.21	1.43
District of Columbia	1.92	.52	5.44	--------	.71	.00	2.28	.08	.40
Virginia	1.41	.27	5.82	--------	.33	.03	.77	.63	3.47
West Virginia	.41	.16	1.36	--------	.49	.26	.27	.25	1.05
North Carolina	.92	.17	1.08	--------	.25	.18	--------	.54	4.84
South Carolina	1.34	.43	.95	.56	.09	.04	.97	1.56	2.56
Georgia	.09	.05	1.55	.25	.15	.03	.20	.37	.55
Florida	.13	.19	1.74	.57	.03	.02	.21	.12	.13
Kentucky [1]	--------	--------	--------	--------	--------	--------	--------	--------	--------
Tennessee	.40	.11	1.67	.15	.48	.24	[2] .69	.57	.59
Alabama	.26	.15	1.88	.30	.15	.09	1.65	.30	.91
Mississippi	2.29	.18	1.57	2.76	.09	.08	1.89	1.28	9.73
Arkansas	.10	.04	.51	.16	.06	.07	[2] .09	.28	.66
Louisiana	.16	.36	.25	.03	.39	.05	[2] 1.23	.73	.17
Oklahoma [3]	.02	.19	1.29	.07	.29	1.58	.26	.26	.59
Texas	--------	.11	--------	--------	.12	--------	--------	.13	--------
Montana	.47	.04	1.80	1.02	1.49	.38	.24	.13	1.11
Idaho	1.60	.11	.98	.47	.28	.51	.21	.04	1.56
Wyoming	.33	.23	8.64	.52	.42	2.25	[2] .05	.05	.42
Colorado	1.06	.21	17.52	3.57	.57	.41	1.00	.07	3.19
New Mexico	.99	1.11	4.70	.90	.60	.63	2.74	.18	.39
Arizona	.65	.10	5.50	1.09	.31	.27	3.57	.58	1.30
Utah [1]	--------	--------	--------	--------	--------	--------	--------	--------	--------
Nevada	--------	--------	2.20	1.89	--------	2.51	[2] .31	--------	--------
Washington	1.33	.11	13.94	2.17	.47	1.03	1.06	.13	1.90
Oregon	1.20	.20	5.07	1.12	.51	.91	.71	.22	2.10
California	2.38	.54	15.00	4.17	1.00	.45	2.33	.22	2.19

[1] Reports received weekly. [2] Pulmonary. [3] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,760,000. The estimated population of the 90 cities reporting deaths is more than 30,165,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended September 27, 1930, and September 28, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,058	1,564	
97 cities	350	499	682
Measles:			
45 States	445	745	
97 cities	113	77	
Meningococcus meningitis:			
46 States	66	111	
97 cities	24	55	
Poliomyelitis:			
46 States	595	143	
Scarlet fever:			
46 States	1,511	1,696	
97 cities	441	571	482
Smallpox:			
46 States	140	212	
97 cities	20	24	6
Typhoid fever:			
46 States	976	743	
97 cities	108	117	152
Deaths reported			
Influenza and pneumonia:			
90 cities	353	410	
Smallpox:			
90 cities	0	0	

City reports for week ended September 27, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	0		1	0	3	3
New Hampshire:								
Concord	0	0	0		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	0	0		0	1	0	0
Massachusetts:								
Boston	8	19	14		0	15	2	9
Fall River	3	3	2		0	0	0	0
Springfield	4	3	1		0	2	1	1
Worcester	3	4	2		0	2	0	1
Rhode Island:								
Pawtucket	0	1	2		0	0	0	0
Providence	0	4	1		0	0	0	0
Connecticut:								
Bridgeport	0	4	0		0	0	0	1
Hartford	2	2	1		0	0	2	1
New Haven	1	0	0	1	0	0	0	0
MIDDLE ATLANTIC								
New York:								
Buffalo	7	11	6		0	2	4	7
New York	20	97	28	2	3	11	12	86
Rochester	3	3	1		0	0	0	3
Syracuse	4	2	0		0	0	1	1
New Jersey:								
Camden	1	4	1		0	3	0	0
Newark	2	11	11		0	3	1	6
Trenton	0	2	1		0	0	1	0
Pennsylvania:								
Philadelphia	10	39	9	1	0	6	5	31
Pittsburgh	5	16	12		1	3	2	22
Reading	0	1	0		0	0	2	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	0	8	3		0	0	0	6
Cleveland	7	35	5	5	0	2	5	6
Columbus	5	4	5	1	0	0	1	3
Toledo	0	7	4		0	3	6	1
Indiana:								
Fort Wayne	0	2	0		0	0	0	2
Indianapolis	1	11	2		1	0	1	5
South Bend	1	1	0		0	1	0	3
Terre Haute	0	0	0		0	0	0	0
Illinois:								
Chicago	15	65	78	1	2	7	11	27
Springfield	0	0	0		0	0	1	0
Michigan:								
Detroit	14	46	22	1	0	8	4	17
Flint	2	2	0		0	1	3	2
Grand Rapids	4	2	0		0	0	0	0
Wisconsin:								
Kenosha	15	0	0		0	0	1	0
Madison	1	2	0	1		0	1	
Milwaukee	16	9	4		0	2	6	4
Racine	3	0	0		0	0	0	0
Superior	0	0	0		0	0	0	1

City reports for week ended September 27, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL								
Minnesota:								
Duluth	5	1	0		0	0	0	1
Minneapolis	9	23	4		0	1	8	2
St. Paul	4	12	1		0	0	0	3
Iowa:								
Davenport	0	0	0			0	0	
Des Moines	1	2	0			0	0	
Sioux City	1	2	0			0	0	
Waterloo	4	1	0			0	0	
Missouri:								
Kansas City		6						
St. Joseph	0	1	0		0	0	0	0
St. Louis	2	27	16			13	4	
North Dakota:								
Fargo	0	1	0		0	0	15	1
Grand Forks	0	0	0			0	1	
South Dakota:								
Sioux Falls	0	1	0			0	0	
Nebraska:								
Omaha	0	9	1		0	1	0	0
Kansas:								
Topeka	1	1	1		0	0	0	0
Wichita	0	2	2		0	0	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0		0	0	0	0
Maryland:								
Baltimore	9	17	8	1	0	2	0	11
Cumberland	0	1	0	1	0	0	0	1
Frederick	0	1	0		0	0	0	0
District of Columbia:								
Washington	1	10	13		0	3	0	8
Virginia:								
Lynchburg	0	3	2		0	0	0	0
Norfolk	1	3	1		0	0	1	1
Richmond	0	18	1		0	0	0	2
Roanoke	0	5	4		0	0	0	0
West Virginia:								
Charleston	0	1	1		0	0	8	0
Wheeling	0	1	0		0	0	0	3
North Carolina:								
Raleigh	0	4	0		0	0	0	0
Wilmington	0	1	10		0	0	0	1
Winston-Salem	1	4	4		0	0	0	0
South Carolina:								
Charleston	0	1	0	3	0	0	0	0
Columbia	0	1	0		0	0	1	1
Georgia:								
Atlanta	0	8	7	5	0	0	0	1
Brunswick	0	0	0		0	0	0	0
Savannah	0	1	0		0	0	0	0
Florida:								
Miami	0	2	2		0	0	0	1
St. Petersburg		0			0			0
Tampa	0	1	0	2	2	0	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	0		0	0	0	4
Tennessee:								
Memphis	1	5	5		0	0	0	1
Nashville	0	3	0		0	8	0	1
Alabama:								
Birmingham	0	5	0		2	3	0	3
Mobile	0	1	0	1	0	0	0	1
Montgomery	0	3	0	1		0	0	

City reports for week ended September 27, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	1	0	----------	----------	0	0	----------
Little Rock	0	1	0	----------	0	0	0	0
Louisiana:								
New Orleans	3	8	15	3	0	0	0	10
Shreveport	0	1	0	----------	0	0	0	2
Oklahoma:								
Oklahoma City	0	3	0	----------	0	0	0	5
Tulsa	0	4	2	----------	----------	0	1	----------
Texas:								
Dallas	0	11	10	1	1	1	3	2
Fort Worth	0	3	0	----------	0	0	0	1
Galveston	0	0	0	----------	0	0	0	3
Houston	0	5	9	----------	0	2	0	2
San Antonio	0	2	5	----------	0	0	0	1
MOUNTAIN								
Montana:								
Billings	0	0	0	----------	0	0	0	2
Great Falls	0	0	0	----------	0	0	0	0
Helena	0	0	0	----------	0	0	0	0
Missoula	0	1	0	----------	0	0	0	1
Idaho:								
Boise	0	1	0	----------	0	0	0	0
Colorado:								
Denver	3	10	7	----------	0	0	0	3
Pueblo	1	1	0	----------	0	1	2	0
New Mexico:								
Albuquerque	0	0	0	----------	0	0	0	1
Arizona:								
Phoenix	0	0	2	----------	0	0	0	1
Utah:								
Salt Lake City	1	3	0	----------	0	2	0	0
Nevada:								
Reno	0	0	0	----------	0	0	0	0
PACIFIC								
Washington:								
Seattle	7	3	1	----------	----------	0	6	----------
Spokane	8	2	0	----------	----------	2	0	----------
Tacoma	0	2	0	----------	0	0	0	3
Oregon:								
Salem	0	0	1	----------	0	0	0	0
California:								
Los Angeles	4	26	6	20	0	5	6	9
Sacramento	1	2	0	1	1	1	12	2
San Francisco	26	13	6	----------	1	0	10	2

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	1	2	0	0	0	0	1	0	0	15	25
New Hampshire:											
Concord	0	1	0	0	0	0	0	2	0	0	6
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	0	2
Burlington	0	0	0	0	0	0	0	1	0	0	5
Massachusetts:											
Boston	24	17	0	0	0	13	3	1	0	41	180
Fall River	1	2	0	0	0	1	1	2	0	1	27
Springfield	2	0	0	0	0	4	0	0	0	4	39
Worcester	5	5	0	0	0	3	0	0	0	9	35

City reports for week ended September 27, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND—continued											
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	18
Providence	2	0	0	0	0	4	2	0	0	3	46
Connecticut:											
Bridgeport	2	4	0	0	0	1	0	0	0	3	24
Hartford	1	1	0	0	0	0	0	0	0	1	30
New Haven	1	4	0	0	0	0	1	0	0	3	10
MIDDLE ATLANTIC											
New York:											
Buffalo	8	5	0	0	0	6	2	2	1	24	119
New York	41	16	0	0	0	78	34	12	1	97	1,192
Rochester	3	0	0	0	0	1	2	0	0	6	67
Syracuse	3	3	0	0	0	1	1	0	0	7	36
New Jersey:											
Camden	2	2	0	0	0	0	1	0	0	0	30
Newark	5	3	0	0	0	6	2	2	0	24	85
Trenton	1	6	0	0	0	3	0	1	0	1	29
Pennsylvania:											
Philadelphia	28	22	0	0	0	18	12	12	2	13	426
Pittsburgh	19	13	0	0	0	2	2	0	0	9	177
Reading	0	0	0	0	0	2	0	0	0	0	23
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	7	11	0	0	0	8	2	2	0	6	148
Cleveland	17	19	0	0	0	9	3	2	0	18	164
Columbus	5	2	0	4	0	2	1	0	0	0	76
Toledo	5	9	0	1	0	2	2	1	0	2	74
Indiana:											
Fort Wayne	1	0	0	0	0	1	1	1	0	0	36
Indianapolis	7	11	0	0	0	5	2	1	0	2	-------
South Bend	2	2	0	0	0	1	0	0	0	0	25
Terre Haute	1	0	0	0	0	0	0	0	0	0	16
Illinois:											
Chicago	45	62	0	0	0	45	6	3	0	54	666
Springfield	2	0	0	0	0	0	1	0	0	1	13
Michigan:											
Detroit	37	33	0	0	0	22	4	3	0	63	218
Flint	7	15	0	0	0	2	1	1	0	1	35
Grand Rapids	5	9	0	0	0	0	1	0	0	1	37
Wisconsin:											
Kenosha	0	3	0	0	0	0	0	0	0	2	9
Madison	0	1	0	0	-------	-------	0	0	-------	1	-------
Milwaukee	13	9	0	0	0	4	0	1	0	18	101
Racine	3	12	0	0	0	1	0	1	0	4	13
Superior	1	0	0	0	0	1	0	0	0	2	9
WEST NORTH CENTRAL											
Minnesota:											
Duluth	5	1	0	0	0	1	0	0	0	9	26
Minneapolis	26	4	0	0	0	2	2	0	0	1	87
St. Paul	11	2	1	0	0	2	1	1	0	2	45
Iowa:											
Davenport	1	0	0	2	-------	-------	0	0	-------	0	-------
Des Moines	3	2	0	1	-------	-------	0	0	-------	0	24
Sioux City	1	3	0	0	-------	-------	1	0	-------	1	2
Waterloo	1	1	0	0	-------	-------	0	0	-------	1	-------
Missouri:											
Kansas City	7	-------	0	-------	-------	-------	2	-------	-------	-------	-------
St. Joseph	2	2	0	0	0	1	0	0	0	1	23
St. Louis	13	14	0	0	0	21	5	6	1	1	204
North Dakota:											
Fargo	2	0	0	0	0	0	0	0	0	3	6
Grand Forks	1	1	0	0	-------	-------	0	0	-------	0	-------
South Dakota:											
Sioux Falls	1	0	0	1	-------	-------	0	0	-------	0	9

City reports for week ended September 27, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—contd.											
Nebraska:											
Omaha	2	7	0	7	0	3	0	0	0	3	34
Kansas:											
Topeka	2	0	0	0	0	0	0	0	0	0	13
Wichita	3	0	0	0	0	1	1	0	0	0	26
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	0	0	0	0	0	0	0	0	0	39
Maryland:											
Baltimore	8	3	0	0	0	16	8	3	1	11	178
Cumberland	0	2	0	0	0	1	1	0	0	0	14
Frederick	0	0	0	0	0	0	0	0	0	0	3
District of Col.:											
Washington	8	3	0	0	0	6	3	2	0	2	127
Virginia:											
Lynchburg	1	0	0	0	0	0	1	2	0	0	5
Norfolk	0	2	0	0	0	1	0	1	1	0	--------
Richmond	7	7	0	0	0	5	1	4	0	0	42
Roanoke	3	4	0	0	0	0	0	2	0	5	18
West Virginia:											
Charleston	1	0	0	0	0	0	1	1	1	1	25
Wheeling	2	1	0	0	0	0	0	0	0	0	16
North Carolina:											
Raleigh	0	1	0	0	0	2	0	0	0	0	18
Wilmington	1	0	0	0	0	0	0	0	0	0	12
Winston-Salem	4	2	0	0	0	2	1	1	0	2	22
South Carolina:											
Charleston	0	1	1	0	0	3	2	3	0	0	29
Columbia	1	1	0	0	0	1	0	1	0	0	11
Georgia:											
Atlanta	6	5	0	0	0	3	2	2	3	0	63
Brunswick	0	0	0	0	0	0	0	0	0	0	5
Savannah	0	0	0	0	0	6	1	7	0	0	32
Florida:											
Miami	0	2	0	0	0	0	0	1	1	0	19
St. Petersburg	0	--------	0	--------	0	0	0	--------	1	--------	7
Tampa	0	1	0	0	0	1	0	0	0	1	12
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	1	0	0	0	2	0	0	1	0	26
Tennessee:											
Memphis	3	2	0	0	0	4	4	0	0	0	50
Nashville	2	5	0	0	0	2	4	0	1	0	50
Alabama:											
Birmingham	6	8	0	0	0	1	3	2	0	6	62
Mobile	0	2	0	0	0	0	0	0	0	0	17
Montgomery	1	1	0	0	--------	--------	0	1	--------	0	--------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	1	0	0	--------	--------	0	0	--------	0	--------
Little Rock	2	0	0	0	0	2	1	1	0	0	--------
Louisiana:											
New Orleans	3	5	0	1	0	7	4	7	0	0	144
Shreveport	1	0	0	0	0	0	0	1	1	0	24
Oklahoma:											
Oklahoma City	1	8	0	1	0	1	2	1	0	0	51
Tulsa	4	3	0	0	--------	--------	1	6	--------	0	--------
Texas:											
Dallas	3	8	0	0	0	1	2	1	0	3	45
Fort Worth	1	0	0	0	0	0	1	0	1	0	29
Galveston	1	0	0	0	0	0	0	0	0	0	12
Houston	1	0	0	0	0	3	1	0	0	0	67
San Antonio	0	1	0	0	0	10	1	0	2	1	47
MOUNTAIN											
Montana:											
Billings	1	0	0	0	0	0	0	1	1	1	8
Great Falls	1	3	0	0	0	0	0	0	0	0	11
Helena	0	2	0	0	0	0	0	0	0	0	4
Missoula	0	0	1	0	0	0	0	0	0	0	6

City reports for week ended September 27, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
MOUNTAIN—contd.											
Idaho:											
Boise	0	0	0	0	0	0	1	0	0	0	4
Colorado:											
Denver	6	4	0	0	0	5	8	2	0	24	74
Pueblo	1	0	0	0	0	0	0	1	0	0	9
New Mexico:											
Albuquerque	0	2	0	0	0	4	2	2	0	0	9
Arizona:											
Phoenix	1	2	0	0	0	2	0	0	0	0	8
Utah:											
Salt Lake City	8	2	0	0	0	0	2	1	0	15	15
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	6	14	1	0			2	1		8	
Spokane	8	2	1	1			1	0		1	
Tacoma	1	1	1	8	0	2	1	1	0	0	19
Oregon:											
Salem	1	0	1	0	0	0	1	0	0	0	
California:											
Los Angeles	12	12	0	0	0	20	8	2	0	23	242
Sacramento	2	2	0	1	0	1	1	1	0	5	21
San Francisco	8	6	0	3	0	4	1	1	0	14	169

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	7	1
Massachusetts:									
Boston	0	0	1	0	0	0	3	17	1
Worcester	0	0	1	1	0	0	0	0	0
Connecticut: [1]									
Hartford	0	0	0	0	0	0	1	1	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	0	0	0	0	1	4	0
New York	3	2	2	2	0	0	20	4	0
Rochester	0	0	0	0	0	0	1	9	3
Syracuse	0	0	0	0	0	0	1	12	4
Pennsylvania:									
Philadelphia	1	0	1	1	0	0	1	4	0
Pittsburgh	0	1	0	0	0	0	0	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	0	0	0	0	6	2
Cleveland	2	1	0	0	0	0	1	21	5
Columbus	0	0	0	0	0	0	0	3	0
Toledo	0	0	1	1	0	0	0	3	0
Indiana:									
Indianapolis	1	1	0	0	0	0	0	3	0
Illinois:									
Chicago	4	2	0	0	1	1	3	25	1
Michigan:									
Detroit	5	1	2	0	0	0	4	6	0
Grand Rapids	0	0	0	0	0	0	1	0	1
Wisconsin:									
Kenosha	0	0	0	0	0	0	0	1	0
Milwaukee	0	0	0	0	0	0	0	16	0

[1] Typhus fever, 2 cafes: 1 case at New Haven, Conn., and 1 case at Savannah, Ga.

City reports for week ended September 27, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	1	0
Minneapolis	0	0	0	0	0	0	0	4	0
Iowa:									
Sioux City	0	0	0	0	0	0	0	5	1
Waterloo	0	0	0	0	0	0	0	2	0
Missouri:									
St. Joseph	0	0	0	0	0	0	0	1	0
St. Louis	2	0	0	0	0	0	0	0	0
South Dakota:									
Sioux Falls	0	0	0	0	0	0	0	1	0
Kansas:									
Topeka	0	0	0	0	0	0	0	1	0
Wichita	0	0	0	0	0	0	0	7	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	0	0	0	0	1	1	0
Virginia:									
Lynchburg	0	0	0	0	0	0	0	1	0
Norfolk	0	0	0	0	0	0	1	4	0
Richmond	0	0	0	1	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	3	2	0	0	0
Winston-Salem	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	0	1	0	0	0
Georgia:[1]									
Atlanta	0	0	0	0	1	1	0	0	0
Florida:									
Miami	0	0	0	0	1	0	0	0	0
Tampa	0	0	0	0	0	0	0	1	1
EAST SOUTH CENTRAL									
Kentucky:									
Covington	0	0	0	0	0	0	0	1	0
Tennessee:									
Memphis	0	0	0	0	0	0	1	2	0
Alabama:									
Birmingham	1	1	0	0	0	2	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	2	2	0	0	0
Oklahoma:									
Tulsa	0	0	0	0	0	0	0	1	0
Texas:									
Dallas	0	0	0	0	1	1	0	0	0
Fort Worth	0	0	0	0	0	1	0	0	0
Houston	0	0	0	0	0	1	0	1	1
MOUNTAIN									
Colorado:									
Denver	1	1	0	0	0	0	1	0	0
New Mexico:									
Albuquerque	0	0	0	0	0	1	0	0	0
Utah:									
Salt Lake City	1	2	0	0	0	0	0	2	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	1	1	0
California:									
Los Angeles	1	1	0	0	1	0	1	6	4
San Francisco	1	1	1	0	0	0	1	22	2

[1] Typhus fever, 2 cases: 1 case at New Haven, Conn., and 1 case at Savannah, Ga.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended September 27, 1930, compared with those for a like period ended September 28, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, August 24 to September 27, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929
98 cities	[2] 39	62	41	[3] 64	45	66	47	75	[4] 57	83
New England	49	45	35	[3] 46	55	47	31	49	51	76
Middle Atlantic	31	54	31	45	28	41	38	54	33	60
East North Central	46	75	49	86	64	95	75	96	75	90
West North Central	27	25	34	38	55	58	47	64	[4] 56	100
South Atlantic	[2] 60	90	60	92	62	133	42	114	92	112
East South Central	13	116	54	75	27	116	27	137	34	137
West South Central	71	137	60	133	49	61	67	149	146	164
Mountain	69	17	43	70	34	26	26	70	60	26
Pacific	19	27	38	34	26	22	14	19	31	65

MEASLES CASE RATES

	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929
98 cities	[2] 20	14	24	[3] 12	16	16	16	15	[4] 19	13
New England	18	20	33	[3] 21	38	16	18	31	42	18
Middle Atlantic	23	8	28	7	20	12	17	7	13	10
East North Central	8	22	13	16	9	20	14	17	13	13
West North Central	27	8	30	2	15	6	19	6	[4] 33	10
South Atlantic	[2] 30	13	26	2	5	7	20	7	9	13
East South Central	13	7	27	14	7	7	0	7	74	0
West South Central	11	8	0	4	4	11	0	8	11	11
Mountain	34	44	51	26	34	61	43	26	26	44
Pacific	35	19	40	46	19	39	21	51	19	24

SCARLET FEVER CASE RATES

	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929
98 cities	[2] 42	41	43	[3] 52	51	54	62	68	[4] 72	95
New England	51	38	55	[3] 83	51	52	71	49	80	99
Middle Atlantic	28	16	25	25	27	16	47	25	33	42
East North Central	48	63	47	70	85	90	91	121	118	161
West North Central	42	44	57	67	34	58	44	92	[4] 76	108
South Atlantic	[2] 67	45	66	64	51	47	40	66	57	105
East South Central	115	34	67	41	40	96	40	28	128	75
West South Central	15	72	67	34	26	91	56	72	56	72
Mountain	86	61	34	17	77	70	69	113	94	139
Pacific	31	46	33	77	73	72	78	68	87	84

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930 and 1929, respectively.
[2] Columbia, S. C., not included.
[3] Pawtucket, R. I., not included.
[4] Kansas City, Mo., not included.

Summary of weekly reports from cities, August 24 to September 27, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

SMALLPOX CASE RATES

	Week ended—									
	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929
98 cities	[2] 2	4	3	[3] 4	3	3	5	5	[4] 3	4
New England	0	0	0	[3] 0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	0	10	3	10	2	4	9	10	3	3
West North Central	8	4	13	2	27	8	21	6	[4] 16	8
South Atlantic	[2] 0	0	4	0	0	2	0	0	0	0
East South Central	0	0	0	0	0	0	0	0	0	0
West South Central	4	4	0	0	0	0	0	0	4	0
Mountain	0	0	0	9	0	9	0	52	0	96
Pacific	12	14	14	14	9	12	5	17	19	10

TYPHOID FEVER CASE RATES

	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929
98 cities	[2] 25	27	21	[3] 18	27	21	22	22	[4] 18	20
New England	11	29	11	[3] 2	20	16	11	13	11	7
Middle Atlantic	21	28	22	20	25	18	16	14	14	12
East North Central	10	13	12	13	17	10	11	11	9	9
West North Central	19	23	13	12	21	17	28	6	[4] 16	23
South Atlantic	[2] 82	52	53	34	64	34	62	26	51	17
East South Central	47	103	54	55	54	89	54	0	20	82
West South Central	71	50	49	15	56	50	67	84	37	27
Mountain	43	17	9	44	60	70	0	340	43	313
Pacific	9	12	9	14	5	19	17	7	14	10

INFLUENZA DEATH RATES

	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929
91 cities	[2] 4	2	3	[3] 3	3	3	3	2	[4] 3	5
New England	0	0	0	[3] 2	0	0	2	2	2	2
Middle Atlantic	3	2	3	2	4	2	2	0	2	5
East North Central	4	2	2	6	3	2	3	2	2	4
West North Central	3	0	6	0	0	6	0	6	[4] 0	3
South Atlantic	[2] 7	2	7	4	2	2	0	2	4	6
East South Central	7	0	0	7	22	7	29	7	15	0
West South Central	8	4	11	0	0	12	8	0	4	12
Mountain	0	9	9	0	0	9	17	9	0	17
Pacific	3	0	0	3	0	0	0	9	6	3

PNEUMONIA DEATH RATES

	Aug. 30, 1930	Aug. 31, 1929	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929
91 cities	[2] 53	55	55	[3] 57	55	55	58	54	[4] 58	67
New England	47	49	51	[3] 44	62	36	51	29	35	72
Middle Atlantic	60	61	68	75	67	66	68	59	76	72
East North Central	50	51	36	44	43	47	43	47	48	54
West North Central	38	33	50	57	44	45	74	39	[4] 31	81
South Atlantic	[2] 52	56	62	64	53	52	51	66	51	60
East South Central	52	52	103	75	29	90	81	67	74	119
West South Central	38	98	54	31	61	55	50	51	77	94
Mountain	51	44	51	52	120	70	112	104	51	70
Pacific	55	28	34	31	31	41	49	57	49	38

[2] Columbia, S. C., not included.
[3] Pawtucket, R. I., not included.
[4] Kansas City, Mo., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended September 20, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended September 20, 1930, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]							
Nova Scotia	1		7				
New Brunswick							4
Quebec					3		30
Ontario	8		5		53		33
Manitoba					8		
Saskatchewan				1	6		6
Alberta					11	1	3
British Columbia		11			3	1	4
Total	9	11	12	1	84	2	80

[1] No case of any disease included in the table was reported during the month.

Quebec Province—Communicable diseases—Week ended September 27, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended September 27, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Ophthalmia neonatorum	1
Chicken pox	31	Puerperal fever	1
Diphtheria and croup	41	Scarlet fever	56
Influenza	1	Tuberculosis	41
Measles	47	Typhoid fever	39
Mumps	5	Whooping cough	77

CUBA

Provinces—Communicable diseases—Four weeks ended August 30, 1930.—During the four weeks ended August 30, 1930, cases of certain communicable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1	1		5	1		8
Chicken pox	1	1		1			3
Diphtheria		20	2	2	1	2	27
Malaria		13		3	14	31	64
Measles		1	1	1			3
Paratyphoid fever	3	2	1	2		7	15
Scarlet fever		6					6
Tetanus, infantile				1			1
Typhoid fever	3	31	15	50	8	21	128

DENMARK

Communicable diseases—July, 1930.—During the month of July, 1930, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	18	Paratyphoid fever	30
Chicken pox	10	Poliomyelitis	5
Diphtheria and croup	325	Puerperal fever	18
Erysipelas	264	Scabies	480
German measles	5	Scarlet fever	160
Influenza	2,406	Typhoid fever	12
Lethargic encephalitis	15	Undulant fever (Bac. abort. Bang)	27
Measles	1,609	Whooping cough	1,265
Mumps	546		

GERMANY

Bavaria—Vital statistics—First quarter of 1930.—The numbers of births, deaths, marriages, and deaths of infants under 1 year which occurred in Bavaria during the first quarter of 1930, as compared with the corresponding period of 1929 and 1913, are given in the following table:

Vital statistics for the first quarter of the years 1930, 1929, and 1913

	1930	1929	1913
Births	39,947	41,243	52,427
Deaths	25,719	32,023	34,209
Marriages	13,771	12,548	10,708
Deaths under 1 year	4,319	5,415	9,098

Estimated population of Bavaria during 1929, 7,510,435.

JAMAICA

Communicable diseases—Four weeks ended August 16, 1930.—During the four weeks ended August 16, 1930, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica outside of Kingston, as follows:

Disease	Cases		Disease	Cases	
	Kingston	Other localities		Kingston	Other localities
Cerebrospinal meningitis		2	Poliomyelitis		1
Chicken pox	2	16	Puerperal fever		1
Dysentery		1	Tuberculosis	36	55
Erysipelas		3	Typhoid fever	6	62
Leprosy		1			

PERU

Eradication of bubonic plague.—According to a decree dated September 5, 1930, promulgated by the President of the Provisional Government of Peru, the National Public Health Service is authorized to carry on a campaign to combat, until eradicated, bubonic plague in the Republic of Peru. The work will be carried on with the cooperation of the Pan American Sanitary Bureau, and Medical Director J. D. Long and Surgeon C. R. Eskey, officers of the United States Public Health Service, who have been designated technical adviser and epidemiologist, respectively, by the National Public Health Service of Peru for the purposes of the campaign.

PORTO RICO

San Juan—Communicable diseases—Five weeks ended September 13, 1930.—During the five weeks ended September 13, 1930, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	5	Tuberculosis	79
Malaria	7	Typhoid fever	6
Measles	1		

TRINIDAD (BRITISH WEST INDIES)

Health conditions—Year 1929.—During the year 1929 health conditions on the island of Trinidad were good notwithstanding a limited outbreak of poliomyelitis in the Siparia district. The general death rate was 19.4 per 1,000 population, which is slightly less than that for the preceding year. The venereal diseases, malaria, dysentery, and tuberculosis are the most prevalent diseases. Venereal-disease infection continued high. The death rate from malaria during 1929 was the lowest on record, and dysentery and diarrhea and enteritis were also less prevalent than during the preceding year. There was also a decrease in the number of cases of typhoid fever, 228 cases being reported during 1929 as compared with 295 in 1927 and 250 in 1928. Hookworm infection was still high.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30	September, 1930: 6	Sept. 13	Sept. 20	Sept. 27	Oct. 4, 1930
Afghanistan	C						[1] P						P						
China:																			
Canton	C			3	2		2	1											
	D						1												
Shanghai	C													8	4		22		
	D														1	1	1		
Tientsin	C												2	1					
Swatow	C			3	7					1									
India	C	10,817	41,462	56,311	37,102	6,728	5,520	5,701	8,172	7,199	11,597	11,993							
	D	5,866	27,906	44,878	25,711	3,712	3,095	3,133	3,882	3,676	6,033	6,345							
Bassein	C		7	7											1				
	D		5	5															
Bombay	C	4								3	2	3	6						
	D									2	1	1	4						
Calcutta	C	354	647	609	327	81	53	49	37	18	10	17	18	8	10		9		
	D	220	414	372	179	54	28	23	23	7	7	10	6	3	3		6		
Negapatam	C				1														
	D				1														
Rangoon	C	2	1	9	6	1				1					1				
	D	2	1	3	4	1				1									
India (French):																			
Chandernagor	C	1	6	6	3			1											
	D	3	5	6	2														
Karikal	C	12	1		3														
	D	9	1		3														
India: Portuguese	C											1							
Indo-China (see also table below):																			
Pnompenh	C		2	1	40	9	16	7		5	3	3							
	D	6		5	18	6	9	5	2	3	2	1							
Saigon and Cholon	C	14	76	160	48	7	1	1	1	2	2	1							
	D	6	55	101	23	3					1								

Philippine Islands:[2]																			
Ports—																			
Cebu	C				1	20	13	13	9	5	4			1	1				
	D					9	7	12	8	4	4			1	1				
Iloilo	C						1	11	17	9	19	32	4	3	4	1	2	1	
	D							9	13	10	18	19	9	4	5	2	3	2	
Manila	C			1							1			16	13	5	4	2	1
	D													5	6	1			1
Provinces—																			
Antique	C									14	3		3	2	21	12	8	12	
	D									7	3		2	1	10	12	7	8	
Bohol	C										54	54	30	30	26	4	1		
	D										29	32	18	12	11	2			
Bulacan	C				3		1	1	2	1				1	1	1			2
	D				1									1					1
Capiz	C							2	1	1	1			1					
	D							1	1	1	1								
Cebu	C			1	355	313	222	115	63	55	26	4		1	16	8			
	D			1	170	131	83	60	29	32	15	3		1	6	4			
Iloilo	C				2	20	45	85	159	143	209	127	92	71	57	66	46	18	7
	D				1	10	23	64	96	77	143	91	65	45	44	37	26	15	6
La Union	C						1												
Leyte	C				47	11													
	D				19	11													
Masbate	C				10	14	32	25	21	15	19								
	D				3	2	18	5	10	5	9								
Misamis, Occidental	C					1	2												
	D					1	2												
Negros, Occidental	C			10	140	62	163	172	171	151	79	45	68	40	47	21	15	8	10
	D			7	88	42	90	122	114	97	64	33	43	32	32	18	9	6	5
Negros, Oriental	C					1	1	6	15	6	2								
	D						1	3	9	1	3								
Nueva Acija	C								1										
	D								1										
Pampanga	C				2	2								1					
Pangasinan	C					2		1		1									
	D					2				1									
Rizal	C				1		1												
	D				1		1												
Samar	C										5	3	10			2	1	4	
	D										5	3	8			2		4	
Surigao	C										15	2	11	1					
	D										9	2	6	2					
Tarlac	C									1									
Siam	C	1	29	33	27	8	3	8	1		1	1	1						
	D		13	21	19	4	1	3	1		1		1						
Bangkok	C	2	15	9	12		3	4	1	1		1							
	D	1	4	3	5		1	1	1	1		1							
Nagara Pathom	C		10																
	D		2																

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.
[2] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	Oct. 4, 1930
Siam—Continued.																			
Songkla	C						8		2										
	D						4		2										
On vessel:																			
S. S. Malwa from Shanghai	D																1		
S. S. Sassari at Massoua, from Jeddah	C			1															
	D			1															
On small boat at Port Cebu, from Bantayan Island	C				1														
	D				1														

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930: 1–10	11–20	21–30	July, 1930: 1–10	11–20	21–31	August, 1930: 1–10	11–20	21–31	Sept. 1–10, 1930
Indo-China (French) (see also table above):															
Annam [1]	C	4	52	60	23	2	14				1		3		
Cambodia [1]	C	90	81	24	88	56	88				43	37	22		23
Cochin-China [1]	C	65	82	48	671	147	126				46	22	5		9

PLAGUE

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	Oct. 4, 1930
Algeria:																			
Algiers	C						1	2			1		6	1	2	6	2		
Constantine	C				1	1													
Oran	C							2	1	1	1	1	1	1	2	3	4		
Philippeville	C														1			1	
Azores: Ponta Delgada	C		8																
	D		5																
Belgian Congo	C					2				1		1		2	3				
	D					2				1		1			3				
British East Africa (see also table below):																			
Tanganyika	C		44																
	D		20																
Uganda	C	98	117	227	406		50	100	78	52	67								
	D	87	105	195	328		47	97	69	50	64								
Canary Islands: Las Palmas	D									1									
Ceylon:																			
Colombo	C	4	1	6	1	1	2					1	1	2				P	
	D	4	1	5	1	1	2					1	1	3					
Plague-infected rats		2	4		1														
Chile: Antofagasta	C	1	1																
	D	2	1																
China: Manchuria—Tungliau and Nungan	C												30			29	P		
Dutch East Indies:																			
Batavia and West Java	C	124	87	82	98	19	25	18	22	19	30	20							
	D	122	81	82	98	19	25	18	22	19	30	20							
Plague-infected rats		3	8	5	4						1				1	1			
Java and Madura	D	223	173	185	202	55	56	58	48	45	51	47	45	55					
Ecuador (see table below).																			
Egypt:																			
Alexandria	C	4	2	13	19	8	8	3	4	2	2	4	3	3	3	2	2	2	1
	D	1	2	3	9	2	3	2	3	2	1	3		5	1	2		3	1
Assiout	C		14	20	9	1	1												
	D		5	5	3	1	1												
Beheira	C	4																	
Beni-Suef	C	4											1						
Dakahlieh	C	5	5	11	1														
	D	1		2															
Gharbieh	C		1							3									
	D		1							1									
Girga	C		1				1							1					
Minieh	C			7	10	2	1												
	D			1	1														
Port Said	C		1	2	2				1	1									

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	Oct. 4, 1930
France:																			
Marseilles	C													2	2	1			
St. Ouen	C							1											
	D							1											
Gambia	C												4						
	D												4						
Greece (see also table below):																			
Patras	C	1			1			1											
Pyrgos	C	1																	2
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats					1														
India	C	4,087	2,215	648	240	70	75	87	145	145	189	293							
	D	3,344	1,960	635	187	46	46	62	102	98	84	154							
Bassein	C	3												1		1			
	D	1												1		2			
Bombay	C	7	4	6	3				1						1				
	D	5	8	5	2				1						1				
Plague-infected rats		86	108	81	26	13	14	10	15	10	8	9	9	12	9	11	15		
Madras Presidency	C	157	44	38	39	10	1	10	26	35	21	7							
	D	87	19	11	22	4	1	9	17	13	9	1							
Rangoon	C	3	5	4	1				2	2	1			2	1	5	2		
	D	3	4	3	1				2	1	1			2	1	4	2		
Plague-infected rats		3	4	5	1	2	2		2	4		2	1	2		2	4		
India (Portuguese)	D			7								P							
Indo-China (see also table below):																			
Pnompenh	C		3	3	6		1	1			2		2	2	1				
	D	13	4	1	7		1	1											
Saigon and Cholon	C	1		1	2							1			1				
	D	1			1														
Iraq: Baghdad	C	7	6	37	28	10	4	2	2	4	3	2							1
	D	4	2	18	15	5		1	1		2	1							1
Japan: Osaka (vicinity of)—Plague-infected rats		4	3																
Kwang-Chow-Wan	C	7	37	34	31				4			1							
Madagascar (see also table below): Tamatave	C		1		1					2						P			
Morocco	C	55	121	71	3				1		8	7							
	D	18	45	34	4						1	1							

Nigeria: Lagos	C	16		2	5	1				4	1	3	1		1				
	D	5		2	5	1				2	1	3	1						
Plague-infected rats		25	7	17	11	2	3	6	7			4	4						
Senegal (see table below).																			
Siam	C	16	5	5						2	3		2						
	D	15	6	4						1	3		2						
Bangkok	C	5		5						1	2								
	D	4		4							2								
Nagara Pathom	C	1	10																
	D	1	9																
Nagara Rajsima	C	1	1							1			1		1				
	D	1	1							1			1		1				
Syria: Beirut	C				12		2	4	3		1		1	3	2				
Tripolitania	C											2							
Tunisia:																			
Sfax district	C		1	21	9				6		1								
Tunis	C	1	4	1	1		1	4											
	D				1		1												
Union of Socialist Soviet Republics:																			
Salsk Region	C				2			3	2	4		3							
	D				1			2	2	3		2							
Stavropol Region	C				1														
	D				1														
Union of South Africa:																			
Cape Province	C	1		P	1			1					1						
	D	1						1				1							
Orange Free State	C	5	1																
	D	3																	
Transvaal	C	1																	
	D	1																	

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
British East Africa (see also table above):							
Kenya	C	85	16	171	107	97	27
Ecuador: Guayaquil	C	2	0	0	0		
	D	0	0	0	0		
Plague-infected rats		2	0	0	0		
Greece (see also table above)	C		1		1		
Indo-China (see also table above)	C	27	4		11	1	2
Madagascar (see also table above):							
Ambositra Province	C	25	14	1			
	D	20	12	1			
Antisirabe Province	C	38	46	19	3	8	
	D	36	45	19	3	8	
Itasy Province	C	4					
	D	4					
Miarinarivo Province	C	14	1	5	1	1	
	D	14	1	5	1	1	

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
Madagascar (see also table above)—Con.							
Moramanga Province	C	5	3	1	3		
	D	5	3		3		
Tananarive Province	C	52	39	15	16	11	
	D	52	38	14	16	11	
Senegal:							
Baol [1]	C	18	24	13	2	62	79
	D	8	12	11	2	48	20
Dakar [1]	C		2	52	53	140	108
	D		2	42	117	122	90
Louga [1]	C		33	54	60	138	75
	D		10	27	21	103	33
Thies [1]	C	3	12	21	52	54	34
	D	2	9	8	35	39	20
Tivaouane [1]	C	11	71	135	43	119	110
	D	8	38	69	28	70	54

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27
Algeria:																		
Algiers	C	5	1	3			1				1		2					
Constantine	C				1			1										
Oran	C	1																
Arabia: Aden	C	3	1			1												
Bolivia: La Paz.[1]																		
British East Africa (see also table below):																		
Tanganyika	C	103	57	409	1,610	64	4		100	26	51	44	121					
	D	7	14	70	301	13	2		27	4		3	30					
British South Africa:																		
Northern Rhodesia	C	9	1	59														
	D		2	9														
Southern Rhodesia	C		66	155	79	1	12	18										
	D		1	13														
Canada:																		
Alberta	C	10	4				2	1	2	1							1	
Edmonton	C	4	3															
British Columbia—Vancouver	C	20	17	4	2	2	2	1	1	1	1		2			1	1	1
Manitoba	C	4	4	10	4									1				
Ontario	C	100	77	82	47	3	5	6	10	8	3	5	4	2	2	6		1
North Bay	C			1														
Ottawa	C	19	21	25	15	1	1	4	7	5	1	1		2	1	2		
Toronto	C			4	4		1									1		
Quebec	C				4	3					2	2	1					
Montreal	C									7								
Saskatchewan	C	47	41	39	22		2		3				8			1		
Regina	C			4														
Ceylon: Angoda, Western Province	C		6															
	D		2															
China:																		
Canton	C	6	3															
	D	2	3															
Chungking	C		P	P	1	P	P	P	P	P		P	P	P				
Foochow	C		P	P	P		P		P		P		P					
Hong Kong	C	38	18	12	4		2											
	D	25	23	9	3		1											

Manchuria—																		
Harbin	C		1	20	4													
Kwantung—Dairen	C		2	8	16	8												
	D			4	1													
Nanking	C	P	P	P	P		P	P	P	P	P	P	P					
Shanghai—																		
Foreigners only	C	2	3	2	5	1	1	1	1	3						18		
Including natives	D	10	10	5	3											2		
Swatow	D	6	3	6	4	1				1		2	1	1	1			
Tientsin	C	2	2	1														
Chosen (see table below).																		
Colombia:																		
Barranquilla	C	2	1							2								
Buenaventura	C		15	4	6	4	3	2	1		1	1						
Costa Rica:																		
Port Limon	C		6	2	2													
San Jose [2]	C	10	7	2														
Curacao (alastrim)	C	14	2	2	1	2						1						
Dutch East Indies:																		
Borneo	C	185	90	16	12		2											
	D	12	31	1	1													
Java—																		
Batavia and West Java	C	78	64	12	13	3	1	3	1	1	4	5	2			2	1	
	D	6	11	7	3	2	1	1	1	1	1	1	2			1		
East Java and Madura	C		4					1										
Sanggi Islands	C	5	160	26				11		36								
	D	1	24	5				3		2								
Sumatra	C	48																
	D	5																
Egypt: Port Said	C		1	1			2		1									
Great Britain:																		
England and Wales	C	1,700	1,427	1,417	926	156	138	126	109	70	86	95	93	99	106	75	61	
Ashton under Lyne	C	15	18	17	7		4	2	2					1				
Bradford	C		3	2		1												
Cardiff	C	2	3			2												
Leeds	C	16	2			1												
London	C	710	602	637	498	84	52	62	48	36	50	41	51	43	44	36	41	
London and Great Towns	C	1,239	1,066	1,078	753	127	96	102	83	61	73	71	80	79	54	51	54	
	D	3	3															
Sheffield	C	8	2															
Stoke-on-Trent	C	122	85	62	32	3	2	1	3	1	1					1	1	
Scotland	C				4		1								5			
	D						1											
Honduras: Naco	C															5		
India	C	39,329	34,843	22,835	12,962	2,258	2,006	1,853	1,513	11,313	1,282	1,236						
	D	9,109	6,983	5,451	3,531	733	580	577	458	368	327	290						
Bombay	C	718	430	218	113	17	15	11	7	6	2		2		1	1		
	D	431	270	161	79	13	9	9	2	5	2		2		1	2		
Calcutta	C	361	495	302	161	27	19	13	14	4		12	9	4	5	3	2	
	D	305	403	258	146	17	17	12	10	4		8	9	3	4	1	1	

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica, outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27
India—Continued.																		
Cochin	C	291	183	37	16			4	2	2	4	4	4	1	1		1	
	D	35	13	8	4									1				
Karachi	C	33	30	14	7				1	2		2				1	3	
	D	47	17	4	3					2		1					2	
Madras	C	173	133	72	35	6	10	17	16	19		9	10	9	11	6	8	
	D	36	27	15	10	4	1	3	4	3		5	3	1	1	1	3	
Moulmein	C	146	43	89	21	4	10	3	1				2	1				
	D	41	7	21	7	3	4	1	2				1			1		
Negapatam	C			1	2			1		2		2		1	2		6	
Rangoon	C	10	4	6	9	2	1	1		1	1	1						
	D	5		1	2													
Tuticorin	C			5	1													
Vizagapatam	C	69	6	5	1													
	D	18	2	3														
India (French):																		
Chandernagor	C	6	10	24	19	3	1	4										
	D	2	2	7	3	1	1	1								1		
Karikal	C	24	19	12	11	1		1			8		1		5			
	D	7	8	3	8	1		1			8		1		2			
Pondicherry Province	C	21	24	40	23	4	9	8	5	7	8		7		7	1		11
	D	13	20	36	23	3	9	8	5	7	8		7		7	1		11
India (Portuguese)	C	38	44	47	28	1				1	6	1	1					
	D	2	8	8	10				1	1			1					
Indo-China (see also table below):																		
Pnompenh	C			3				1										
	D		2		1			1				1						
Saigon and Cholon	C	3	5	3	1						1							
	D	1	5	2						1	1	1		1				
Iraq:																		
Baghdad	C		8	1	1	1	1	1				1						
	D		1	1				1				1						
Basra	C		1															
Mossoul Liwa	C		22	21	4	47	20											63
	D		3	3	1	19	1											27

Ivory Coast (see table below).																		
Jamaica (alastrim)	C			2														
Japan: Tokyo	C		1															
	D		1															
Macao	D	3	2	1														
Mexico (see also table below):																		
Jalisco (State) Guadalajara	D	22	20	7	15	3	1				1							
Juarez	C	2			6						2							
	D				1						1							1
Mexico City and surrounding territory	C	106	99	80	77	10	12	4	11	2	3	3		7				
	D	31	47	32	17	2	3	1	2	1	3	2		1				
Progreso	C			1														
	D			1	1													
Morocco (see table below).																		
Nigeria: Lagos	C	1	1		1													
Poland	C		7	3	2													
Portugal:																		
Lisbon	C	7	8	8	10		7		6		6	19	25	7	8		12	
Oporto	C												1					
Rumania	C	2																
Siam	C		8	2		2		4										
	D		4					3										
Somaliland, British: Boales	C	2																
	D	6																
Spain	C				12		1	1	3	2					4	1		
Straits Settlements	C	5	5	11	9	1	2	7	1	1	1	1	5	1	2	2	1	
	D	1	2	3	2	1	1	1				1	1		1			
Sudan (Anglo-Egyptian)	C	60	42	19	67	8	1		3				42	102	5	20	1	25
	D	5	4	2	3		1						3	50	2			2
Sudan (French) (see table below).																		
Switzerland: Berne Canton	C								1	1	1							
Syria (see table below).																		
Taiwan: Taihoku (see table below).																		
Tunisia: Tunis	C	3	4	2	2				1									
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P					P									
Orange Free State	C	P						P	P	P								
Transvaal	C	P									P	P	P					
Upper Volta	C	2	3	1	13													
Zanzibar	C	13																
On vessel:																		
S. S. Elysia, at Port Sudan, from Bombay	C		1															
S. S. Naldera, at Port Said	C			1														
S. S. Manoa, from Honolulu to San Francisco	C					1												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930			July, 1930			August, 1930			Sept. 1-10, 1930
						1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	
Indo-China (see also table above)	C	434	26	261	305	80	133				238	59	34		54
Ivory Coast	C		7												
Sudan (French)	C	213	609	521	274	76				34				39	
	D	11	49	36	32	18								3	
Syria: Beirut	C	18	17	19	7	6	1				2	1			
Taiwan: Taihoku	C	43	58	12											

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
British East Africa (see also table above):							
Kenya	C	12	175	174	171	142	186
Uganda	C	109			78		
	D	99			69		
Chosen	C	263	236	253	107		3
	D	71	53	53	35		
Seishin	C	4		5	2	1	2
	D	1		1	1		

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
France	C	23	8	58	51		
Mexico: Durango (see also table above)	D	6	5	4	4	3	3
Morocco	C	74	17	10	18	5	3
Turkey	C	114		3	16		
	D	42					

OLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27
Algeria:																		
Algiers	C	6	8	15	3		1	2	3				2		3			
Constantine Department	C	11	15	6	12		1	1					3					
Oran	C			3	4		2	1			1			1				
Arabia: Aden	C	1																
	D	1																
Bolivia: La Paz.[1]																		
Brazil: Porto Alegre	C			1														
Bulgaria	C	9	15	6	16		4	5	1		1				2			
	D		1	2	1			1										
China:																		
Manchuria—Harbin (see also table below)	C	4	52	13	8	2												
Shanghai	C	1									1							
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C		1		2	1						1			1	1		1
Beheira Province	C	2	2	49	45		5	1	9								1	
	D			13	4		1		1									
Cairo	C									2			5			1		
Port Said	C												4		1			
Great Britain: Scotland—																		
Dunfermline	C						1											
Glasgow	C			1														
	D			1														
Greece (see table below).																		
Iraq: Baghdad Liwa	C	2																
Ireland:																		
Irish Free State—																		
Galway County—Oughterard	C								2									
Kerry County—Dingle	C		5															
Leitrim County—Mohill	C				9				1									

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27
Ireland—Continued.																		
Irish Free State—Continued.																		
Mayo County—																		
Ballina	C			2	1		1											
Castlebar	C												1					
Swinford	C			14														
Westport	C							2		1								
Roscommon County—																		
Roscommon	C							1										
Strokestown	C							1										
Wicklow County—Shillelagh	C				4	1		1										
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico: Mexico City, including municipalities in Federal District	C	4	4	6	9	2		2	1	2	2	2	3	2				
	D	1	4	3	1					1	1							
Morocco	C	38	15	11	15		4	3	4				8		2			
	D	7	3															
Palestine	C	6	1	2	2	3	1	1	1		1	1	1		1	1		
Poland	C	228	243	171	117		24		12	10	15	2	7		3			
	D	13	15	5	11		4			1		1	1		1			
Portugal:																		
Lisbon	C		4															
Oporto	C	2	1									1						
Rumania	C	185	186	227	58	11	10	3	4	5								
	D	12	11	35	5	5	2	1		2								
Spain: Valencia	C				3		3											
	D						1											
Tunisia	C			6	18			14	10	2	5		3	1	1			
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P					
Natal	C	P	P	P	P	P	P	P	1	P	P	P						
Orange Free State	C	P		P	P	P	P	P	P	P	P	P	P					
Transvaal	C		P					P		P	P	P						
Yugoslavia (see table below).																		

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
China: Harbin (see also table above)	C	------	37	204	240	------	------
Chosen: Seoul	C	17	------	3	43	2	------
Czechoslovakia	C	2	42	29	12	1	------
Greece: Athens	C	6	3	1	3	3	6
Latvia	C	------	------	------	3	3	3
Lithuania	C	70	62	73	27	16	3
	D	5	4	4	------	------	------
Turkey	C	3	1	3	16	2	------
Yugoslavia	C	33	46	22	16	6	------
	D	5	2	4	1	------	------

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Railway, between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

X

UNITED STATES TREASURY DEPARTMENT

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SPECIAL ARTICLES

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

VOL. 45 OCTOBER 24, 1930 NO. 43

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES [1]

September 7–October 4, 1930

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized below. The underlying statistical data are published weekly in the PUBLIC HEALTH REPORTS under the section entitled "Prevalence of disease."

Poliomyelitis.—The reported poliomyelitis incidence has risen, since the last 4-week period, from 1,182 to 1,837 cases, an increase considerably larger than the average seasonal rise. Last year the rise during the corresponding periods was from 309 to 358.

The status and recent tendency in the various geographic sections are shown in the following table:

Region	Number of cases reported in 1929, 4 weeks ended—		Number of cases reported in 1930, 4 weeks ended—		Ratio of current incidence to incidence of corresponding 4 weeks of last year, period ended—	
	Sept. 7	Oct. 5	Sept. 6	Oct. 4	Sept. 6, 1930	Oct. 4, 1930
North Atlantic [1]	155	190	320	449	2.1	2.4
South Atlantic	32	38	35	38	1.1	1.0
East North Central	53	61	118	284	2.2	4.7
West North Central	16	30	358	659	22.4	22.0
South Central [2]	20	10	97	83	4.9	8.3
Mountain and Pacific	33	29	254	324	7.6	11.2
All regions	309	358	1,182	1,837	3.8	5.1

[1] Includes the New England and Middle Atlantic group. The States included are shown in the tabular section of PUBLIC HEALTH REPORTS.
[2] Includes the East and West South Central groups.

During the last eight weeks the incidence in the West North Central group (mainly the States west of the Great Lakes group) has been about 22 times the incidence of the corresponding period of last year. In the Mountain and Pacific groups the incidence has risen in successive periods from 7.6 to 11.2 times the incidence of the corresponding period of last year. In the remaining groups the comparison with last year is not so unfavorable, but in all groups except the South

[1] From the Office of Statistical Investigations, U. S. Public Health Service. The numbers of States included for the various diseases are as follows: Typhoid fever, 41; poliomyelitis, 35; meningococcus meningitis, 42; smallpox, 42; measles, 38; diphtheria, 42; scarlet fever, 41; influenza, 31.

Atlantic it has in most places grown worse during the last 4-week period.

In the South Atlantic group alone has the incidence been little different from that of last year. It is interesting to note that in the recent meningitis outbreak, also, the epidemic reached the South Atlantic group of States a full year after the more western States had been attacked.

Meningococcus meningitis.—During the current 4-week period there were reported 256 cases of meningococcus meningitis, as compared with 379 during the corresponding period of last year and 302 the year before. The current incidence now occupies a median position in relation to the experience of recent years.

During the preceding period of this year there were 332 cases, representing a ratio to the corresponding period of last year of 89 per cent. This ratio to the corresponding period of last year has now declined to 67 per cent—an encouraging sign. The decline has been slower in the Southern States than elsewhere, as apparently the meningitis wave was about a year later there than in the West and North.

Diphtheria.—The incidence continues at a very favorable level, 3,578 cases having been reported in comparison with 5,041 during the corresponding period of last year.

Influenza.—With influenza also the situation seems favorable. Reported cases numbered 535, against 758 for the same period last year.

Measles.—The incidence of measles has been relatively low, the reported cases numbering 1,818, as against 2,188 for the corresponding period of last year.

Scarlet fever.—This disease continues to maintain a low record in relation to recent years. Reported cases were 4,516, as against 5,378 for the similar period last year.

Smallpox.—The incidence of smallpox has returned to the lowest level, in relation to the season, reached during the last four years. The reported cases numbered 437, as compared with 723 cases during the corresponding period last year.

Typhoid fever.—The reported incidence of typhoid fever, 3,147 cases, represents a middle ground in relation to the incidence of recent years. During the corresponding period of last year, 2,552 cases were reported. The current incidence, therefore, is about 23 per cent in excess of that of last year. This is in contrast with the low record of all time, established last spring.

Mortality, all causes.—The mean mortality in a group of large cities during the 4-week period was 10.2 per 1,000 population, according to the Weekly Health Index of the Bureau of the Census. Last year the rate during the corresponding period was 10.7.

SICKNESS AMONG INDUSTRIAL EMPLOYEES IN THE FIRST HALF OF 1930 [1]

The frequency of claims for benefits on account of sickness and nonindustrial injuries causing disability for eight calendar days or longer among approximately 135,000 male industrial employees decreased 34 per cent in the first quarter, and 8 per cent in the second quarter of 1930 as compared with the corresponding periods of 1929. The employees of 16 large establishments are included in the data for the first quarter, and of 15 establishments in the second quarter. Results for the specified quarter of the present year are compared with the corresponding period of a year ago for those establishments only which reported in both years so that as nearly the same population as is possible to obtain was under observation in the two periods.

The favorable health record for the first quarter of 1930 was due in large measure to a decreased incidence of respiratory diseases, especially influenza, which occurred at epidemic frequency in the early part of 1929. In addition to pronounced decreases in the incidence of influenza and pneumonia, the rate of disability from respiratory tuberculosis also declined substantially in the group under consideration.

Nonrespiratory diseases as a whole decreased 6 per cent, and nonindustrial injuries 9 per cent in the first quarter of 1930 as compared with the first three months of 1929.

In the second quarter of 1930 the incidence rate of a majority of the disease groups was lower than in the second quarter of 1929 among the employees covered in the record. The respiratory rate was down 11 per cent, due to improvement in the rates for bronchitis, tonsillitis, and pneumonia, while the nonrespiratory diseases as a whole declined 7 per cent. In this group the largest percentage decline was indicated for diseases of the nervous system.

That disability was relatively infrequent during the first six months of this year is indicated also by comparison with the average rate in 1928 for 13 of the 16 establishments included in the data for 1930. This year's first quarter morbidity rate was down 13 per cent, and the second quarter rate was 16 per cent lower than in the corresponding period of 1928.

With but one exception the establishments sending sickness reports are located north of the Ohio and Potomac rivers and east of the Mississippi. On account of small numbers, the sickness rates for female employees are not presented.

[1] From the Office of Industrial Hygiene and Sanitation in cooperation with the Office of Statistical Investigations, United States Public Health Service.

TABLE 1.—*Frequency of disability lasting 8 consecutive days or longer in specified months of 1930 as compared with the corresponding months of 1929 among the male employees of several industrial establishments which reported their cases to the Public Health Service during both years, and a comparison with the rates for 13 of these establishments in 1928*

Diseases causing disability (numbers in parentheses are disease title numbers from the International List of the Causes of Death, 3d revision, Paris, 1920)	Annual number of disabilities per 1,000 men in—			Per cent increase or decrease in rate for 1930 as compared with 1929
	1930	1929	1928 [1]	
FIRST QUARTER (JANUARY, FEBRUARY, MARCH), SIXTEEN ESTABLISHMENTS				
Sickness and nonindustrial injuries	115.8	175.3	133.8	−34
Nonindustrial injuries	10.7	11.7	10.9	−9
Sickness	105.1	163.6	122.9	−36
Respiratory diseases	49.8	105.0	60.3	−53
Influenza and grippe (11)	23.0	78.1	32.9	−71
Bronchitis, acute and chronic (99)	7.1	6.9	7.7	+3
Pneumonia, all forms (100, 101)	4.7	5.0	4.3	−6
Diseases of the pharynx and tonsils (109)	8.3	8.1	7.1	+2
Tuberculosis of the respiratory system (31)	.4	1.1	(2)	−64
Other respiratory diseases (97, 98, 102–107)	6.3	5.8	8.3	+9
Nonrespiratory diseases	55.3	58.6	62.6	−6
Diseases of the stomach, diarrhea and enteritis (111, 112, 114)	6.0	5.5	6.6	+9
Other diseases of the digestive system (108, 110, 115–127)	9.6	10.2	8.4	−6
Diseases of the circulatory and genito-urinary systems and annexa (87–96, 128–136)	8.8	8.4	9.9	+5
Diseases of the nervous system (70–84)	5.2	5.6	5.8	−7
Diseases of the skin (151–154)	3.8	4.6	4.8	−17
Epidemic and endemic diseases except influenza (1–10, 12–25)	3.8	5.7	6.0	−33
Rheumatism, acute and chronic (51, 52)	6.4	6.4	7.0	0
Lumbago and other diseases of the organs of locomotion (158)	4.0	4.4	4.7	−9
Ill-defined and unknown causes (205)	2.5	1.9	2.7	+32
All other diseases (26–30, 32–37, 41–50, 53–69, 85, 86, 155–157, 159, 164)	5.2	5.9	6.7	−12
Average number of males covered in the record	137,268	136,590	99,982	
SECOND QUARTER (APRIL, MAY, JUNE), FIFTEEN ESTABLISHMENTS				
Sickness and nonindustrial injuries	98.0	106.2	116.6	−8
Nonindustrial injuries	11.2	11.3	10.5	−1
Sickness	86.8	94.9	106.1	−9
Respiratory diseases	32.9	36.9	48.7	−11
Influenza and grippe (11)	13.1	13.1	27.3	0
Bronchitis, acute and chronic (99)	4.2	5.1	5.5	−18
Pneumonia, all forms (100, 101)	2.3	3.3	3.8	−30
Diseases of the pharynx and tonsils (109)	6.9	8.7	5.7	−21
Tuberculosis of the respiratory system (31)	1.7	1.3	(2)	+31
Other respiratory diseases (97, 98, 102–107)	4.7	5.4	6.4	−13
Nonrespiratory diseases	53.9	58.0	57.4	−7
Diseases of the stomach, diarrhea and enteritis (111, 112, 114)	6.2	6.5	6.5	−5
Other diseases of the digestive system (108, 110, 115–127)	9.3	10.3	9.2	−10
Diseases of the circulatory and genito-urinary systems and annexa (87–96, 128–136)	8.3	9.0	8.0	−8
Diseases of the nervous system (70–84)	4.2	5.2	5.3	−19
Diseases of the skin (151–154)	4.1	4.9	4.8	−16
Epidemic and endemic diseases except influenza (1–10, 12–25)	4.3	3.4	4.8	+26
Rheumatism, acute and chronic (51, 52)	6.3	6.5	7.2	−3
Lumbago and other diseases of the organs of locomotion (158)	3.6	3.4	4.3	+6
Ill-defined and unknown causes (205)	2.1	2.4	1.7	−12
All other diseases (26–30, 32–37, 41–50, 53–69, 85, 86, 155–157, 159, 164)	5.5	6.4	5.6	−14
Average number of males covered in the record	132,740	133,636	103,055	

[1] For 13 of these establishments. [2] Included with "Other respiratory diseases."

EXPERIMENTAL SYPHILIS

Lymph Gland Transfer Method of Determining Human Infection with Treponema pallidum

The lymph gland transfer method for the determination of the presence of the *T. pallidum* in human cases of syphilis was applied in 66 instances by G. C. Lake, surgeon, and K. K. Bryant, assistant surgeon, United States Public Health Service. The results obtained indicate the impracticability of using the intratesticular injection of human lymph gland emulsions into rabbits as a method for determining the presence or absence of syphilis in man, except in the early untreated stages. Similarly, the authors' work shows the impracticability of applying this method to the measurement of the chemotherapeutic activity of the arsenicals in the treatment of syphilis in man.

The authors' experience has shown the value of using the results of two sensitive serological tests as presumptive evidence of syphilis in rabbits and as indicating the degree of probability of being able actually to demonstrate the spirochete by the dark field examination of testicular puncture material from rabbits inoculated by the technique which has been employed. It has also shown the value of the dark field examination of emulsion of entire injected testicle as the final test for the presence of *T. pallidum,* particularly in "asymptomatic" animals.

The experiments of which the results are summarized above are reported in National Institute of Health Bulletin No. 157. As long as the supply for free distribution lasts, a copy of this bulletin may be obtained without charge by addressing a request to the Surgeon General, United States Public Health Service, Washington, D. C.

COOPERATIVE RURAL HEALTH WORK OF THE PUBLIC HEALTH SERVICE IN THE FISCAL YEAR 1930 [1]

By L. L. Lumsden, *Medical Director, United States Public Health Service*

In the fiscal year ended June 30, 1930, the United States Public Health Service cooperated in demonstration projects in rural health work in 204 counties in 24 States, as follows:

Alabama.—Colbert, Franklin, Jackson, Lauderdale, Lawrence, Limestone, Madison, and Walker Counties.

Arkansas.—Arkansas, Ashley, Conway, Crittenden, Cross, Desha, Drew, Garland, Jackson, Jefferson, Little River, Mississippi, Monroe, Phillips, Pope, Pulaski, Saline, Union, White, Woodruff, and Yell Counties.

[1] This report applies to work provided for with funds appropriated specifically for "'Special studies of and demonstration work in rural sanitation." It does not cover all cooperative activities of the Public Health Service in rural communities.

California.—San Diego and Santa Barbara Counties and San Joaquin district.

Georgia.—Floyd, Glynn, Laurens, and Walker Counties.

Idaho.—Bonneville and Twin Falls Counties.

Illinois.—Pulaski County.

Iowa.—Washington County.

Kansas.—Brown, Cherokee, Dickinson, Greenwood, Lyon, Ottawa, Sedgwick, and Shawnee Counties.

Kentucky.—Ballard, Bell, Breathitt, Carlisle, Carter, Elliott, Estill, Floyd, Fulton, Hickman, Hopkins, Knox, Lawrence, Lee, Leslie, Letcher, Magoffin, Martin, Mason, McLean, Menifee, Monroe, Morgan, Ohio, Owsley, Perry, Trigg, Webster, Whitley, and Wolfe Counties.

Louisiana.—Assumption, Avoyelles, Caldwell, Catahoula, Concordia, East Carroll, Franklin, Iberia, Iberville, Lafayette, La Fourche, La Salle, Madison, Morehouse, Ouachita, Pointe Coupee, Richland, St. Landry, St. Martin, St. Mary, Tensas, Terrebonne, Washington, and West Carroll Parishes.

Massachusetts.—Barnstable County.

Michigan.—Gennesee and Wexford Counties.

Mississippi.—Bolivar, Harrison, Hinds, Humphries, Issaqueena, Jackson, Sharkey, Sunflower, Union, Warren, Washington, and Yazoo Counties.

Missouri.—Boone, Buchanan, Dunklin, Greene, Jackson, Marion, Miller, Mississippi, New Madrid, Nodaway, Pemiscot, Scott, St. Francois, and St. Louis Counties.

Montana.—Cascade, Gallatin, and Lewis and Clark Counties.

New Mexico.—Bernalillo, Dona Ana, Eddy, McKinley, Santa Fe, Union, and Valencia Counties.

North Carolina.—Cumberland, Edgecombe, Richmond, and Robeson Counties.

Oklahoma.—Okmulgee, Ottawa, and Seminole Counties.

South Dakota.—Pennington County.

Tennessee.—Bledsoe, Clay, Cumberland, Dyer, Fentress, Gibson, Grundy, Hamilton, Jackson, Lake, Lauderdale, Meigs, Montgomery, Obion, Overton, Pickett, Rhea, Roane, Sequatchie, Shelby, Sullivan, Unicoi, Washington, Weakley, and Williamson Counties.

Texas.—Cameron County.

Virginia.—Accomac, Alleghany, Bath, Charlotte, Chesterfield, Northampton, Pittsylvania, Powhatan, Prince Edward, Pulaski, Roanoke, Smyth, and Washington Counties.

Washington.—Clark County.

West Virginia.—Berkeley, Boone, Brooke, Fayette, Gilmer, Hancock, Harrison, Kanawha, Logan, Marion, Monongalia, Ohio, Preston, Raleigh, and Wood Counties.

The results were thoroughly in line with the conclusions in the reports on this activity for the fiscal years 1920 to 1929, inclusive.[2]

Plan of Work

The plan of the work was generally similar to that carried out in each of the 10 preceding fiscal years (Reprints Nos. 615, 699, 788, 887, 964, 1047, 1118, 1184, 1259, and 1339).

The authorization for this work is in the act of February 15, 1893 (ch. 114, 27 Stat. L. 449); the act of August 14, 1912 (ch. 288, 37 Stat. L. 309); and in the annual appropriation acts. The appropriation is specifically for "Special studies of and demonstration work in rural sanitation."

The work is conducted in cooperation with State and local health authorities. It is made a part of a well-rounded comprehensive program of local (county or district) health service.

Through such connection as this with local whole-time health service projects, the Public Health Service can operate most economically and efficiently toward meeting its responsibility to help prevent the spread of human infection in interstate traffic. The coöperative projects also furnish most favorable opportunities for studies, by the Public Health Service, "of the diseases of man and conditions influencing the propagation and spread thereof". Thus, this rural-sanitation activity serves a number of important general purposes besides those specified in the appropriating act, and though quite limited as yet in extent it appears to contribute to the most important results of the Federal Government's operations for the promotion of the general welfare.

The demonstration work in rural sanitation can not, under the provisions of the appropriating act, be conducted in a community unless the State, county, or municipal official agencies concerned agree to pay separately or together at least one-half the expenses of such demonstration work. The funds provided by the State, county, and municipalities, inclusive, for support of the average demonstration project far exceed the allotment from the Federal fund, and in most instances the appropriation from the local official sources (county, township, or town) covers considerably more than 50 per cent of the budget. Though the allotment from the Federal fund may be made under the legal provisions as much as 50 per cent of the budget, it is seldom, even during the developmental stage in the first year or two of the work, made more than 25 per cent. When the health unit

[2] Reprint No. 615, from Public Health Reports of Oct. 1, 1920, p. 15; Reprint No. 699, from Public Health Reports of Oct. 7, 1921, p. 17. Reprint No. 788, from Public Health Reports of Sept. 29, 1922, p. 22; Reprint No. 887, from Public Health Reports of Dec. 14, 1923, p. 24; Reprint No. 964, from Public Health Reports of Oct. 17, 1924, p. 23; Reprint No. 1047, from Public Health Reports of Oct. 23, 1925, p. 33; Reprint No. 1118, from Public Health Reports of Oct. 22, 1926, p. 37; Reprint No. 1184, from Public Health Reports of Oct. 21, 1927, p. 51. Reprint No. 1259, from Public Health Reports of Nov. 30, 1928, p. 57; Reprint No. 1339, from Public Health Reports of Dec. 6, 1929, p. 19.

becomes an established local institution, which is generally the case after several years of cooperation, the Federal allotment is, as a rule, reduced to an amount not exceeding 10 per cent of the local budget. Along with the decrease in the Federal allotment to the unit there is always urged and usually realized a substantial and much more than balancing increase in the appropriation from the local official sources

Under this cooperative arrangement the rural sanitation work of the Public Health Service is carried out in each project by a local health force intended to be permanent and is made a part of a general program of rural health work deemed suitable to the locality. Thus, it is accomplished more economically and with more lasting effects from a demonstration standpoint than it could be if undertaken by a specialized force working a comparatively short time in the locality.

The unit for the work, as a rule, is the county; but it may be a group of townships in the same vicinity or a district comprising two or three adjacent counties. In some of the units, incorporated villages, towns, and cities are included. The population of some of the cities so included ranges as high as 50,000 to 60,000. Under the cooperative arrangements a good program of health work can be carried out in practically any rural county or district in the United States at a cost to the county or district easily within its means. The average cooperative demonstration project is conducted on a cost basis of less than 50 cents per capita of population served and furnishes a striking example of efficiency with economy in public service. In many counties efficient whole-time county health service can be provided at an annual cost of less than $2 to the local taxpayer with real property assessed at $5,000 to $6,000. An annual budget of $10,000 to $15,000 will provide, in most sections of this country, the services of a county health department force consisting of 1 whole-time health officer, 1 whole-time sanitary inspector, 1 or 2 whole-time health nurses, and 1 office clerk. Such a force can render highly effective health service in any county with a population under 30,000. For larger units of population, larger forces are needed and should be provided, certainly after the first year or two of operation.

The members of the working forces in the cooperative demonstration projects are appointed by the proper local government authorities, but the appointees must be acceptable to the cooperative official agencies—the State board of health and the United States Public Health Service. The only ground upon which the interests of the cooperative agencies are likely to meet with respect to the appointments is fitness for efficient services. With such expressed understanding, the local authorities at times may be relieved of local political embarrassment in exercising their appointing power.

All salient branches of health work such as acute communicable disease control measures, sanitation of private homes and public

places, malaria prevention, tuberculosis control, goiter prevention, infant and maternity hygiene, venereal disease prevention, school hygiene, etc., are carried out in the projects. Attention is expected to be concentrated upon the different branches of the work in what appears to be the most advantageous sequence. The various activities can be dovetailed with one another so that every dollar invested and every unit of energy expended may yield the biggest possible return in health promotion and disease prevention. The director of the unit, the county or district health officer or sanitary officer, is given full responsibility for the detailed execution of the work. He has from time to time, and can secure at any time, advice and counsel and active assistance from specially experienced representatives of the State board of health and the United States Public Health Service.

By having all salient branches of health work for the community conducted under the direction of one head, the whole-time county health officer, who is given a status of field agent in the United States Public Health Service, and in some of the States that of deputy State health officer, a maximum of services can be rendered with a minimum of overhead expense, lost motion, and friction. Through good business management, the funds invested in the enterprise can be made to yield a remarkable dividend in the protection and promotion of human health and in a money saving to the community, resulting from the prevention of sickness and loss in wage earning, amounting to many times the cost of the service. The net economic gain is especially impressive in farming communities.

This plan of cooperative rural health work has been evolved in the course of field experience and has been tested under a wide range of local conditions. It seems applicable to all the rural districts of the United States. The provision of means for a reasonably rapid extension of this work would, according to all the evidence, prove highly advantageous from every standpoint—individual, community, State, and national.

Appropriation

The appropriation for the rural sanitation work of the Public Health Service in the fiscal year 1930 was $346,000. Against the amount appropriated was set up a budget saving of $2,000. The unexpended balance from the operations of the preceding fiscal year was $7,720.72.[3] Thus, $351,720.72 was available.

[3] The unexpended balance was due not to an excessive amount of money being available, but to temporary suspensions of the work and consequent decreased expenditure in some of the projects to which allotments had been made for the whole fiscal year 1928. Such suspensions are necessitated by various local circumstances and can not be anticipated when the contracts are made. With the existing differences between the Federal fiscal year and the fiscal years of some of the States and localities in which the work is conducted, it would not be practicable, without lessening the degree of economy striven for, to arrange contracts so that the allotment of Federal funds to every project would be expended exactly by the end of the Federal fiscal year.

Rural health work is applicable to communities in the United States comprising about 60 per cent (or over 70,000,000) of our total population. Such communities include farm and other open-country homes, incorporated rural towns and villages (with populations under 2,500), and, as the county is the logical political unit for official rural health-work administration, many towns and cities with populations ranging from 2,500 to 50,000.

Under present conditions of transportation and travel, rural and urban health conditions constantly react upon each other. Therefore rural health work is of importance to our entire population. The sanitary quality of the tremendous volume of raw foods now shipped daily through interstate traffic is of keen importance, for both humane and business reasons, to our public and our private interests and may be enhanced and safeguarded by reasonably adequate, coordinated, joint activities of governmental agencies—local, State, and Federal. To undertake sanitary control of traffic and travel by inspection and quarantine at our city borders and on our interstate lines now would be futile and ridiculous. The efficient local health department, in doing its local work, performs a duty of state-wide and nation-wide importance with which the State and the Federal health services are concerned. Therefore it seems reasonable and proper for State and Federal agencies to encourage and help in the development and permanent maintenance of such departments.

Only about 24 per cent of our rural population is as yet provided with local health service approaching adequacy under the direction of whole-time local (county or district) health officers.[4] Because of lack of efficient, whole-time rural health service, infections of man are spread constantly within the State and very frequently across interstate lines.

In our rural communities there are about 1,000,000 persons incapacitated all the time by illness, much of which is preventable; about 70 per cent of the school children are handicapped by physical defects most of which are preventable or remediable; about 30 per cent of persons of military age are incapacitated for arduous productive labor or for general military duty, largely from preventable causes; and over 60 per cent of the men and women between 40 and 60 years of age are in serious need of physical reparation, largely as a result of preventable causes. In the registration area of the United States the rural death rate in recent years has been higher than the urban for malaria, influenza, typhoid fever, and tuberculosis of the respiratory tract. In view of these conditions there is no room for reasonable doubt about the need for more and better rural-health service in this country.

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[4] Reprint No. 1372, from Public Health Reports of May 9, 1930.

Efficient health service results in life saving, disease prevention, health promotion, and economic saving. The saving in dollars and cents amounts to many times the cost of the service. Most of our rural county governments are not disposed to establish reasonably adequate county health service without an offer of financial assistance and competent counsel from some outside agency.

The amounts specifically appropriated by Congress for the rural sanitation work of the United States Public Health Service have been as follows:

Fiscal year	Amount	Fiscal year	Amount
1917	$25, 000	1925	$74, 300
1918	150, 000	1926	75, 000
1919	150, 000	1927	75, 000
1920	50, 000	1928	85, 000
1921	50, 000	1929	347, 000
1922	50, 000	1930	346, 000
1923	50, 000	1931	338, 000
1924	50, 000		

Of the amount appropriated for the fiscal year 1931, $185,000 is available for general use and $153,000 for use in the flood counties of the Mississippi Valley.

The total for this activity in the last 15 years has been less than one forty-thousandth of the total congressional appropriation.

Expenditures

The expenditures in the fiscal year 1930 totaled $342,160.79. Of this sum, $331,697.15 was expended in allotments for direct support of cooperative projects in counties or districts, and $10,463.64 was expended for general administration, supervision of local projects, and special studies of the problem of rural sanitation.

Of the expenditures for direct support of units, $249,261.30 was expended in the flood county projects in the Mississippi Valley and $82,435.85 was expended in regular demonstration projects. All of the unexpended balance of $9,559.93 at the end of the fiscal year was in the allotments to the 95 flood county projects.

For the support of the work in the 204 local projects the expenditures from all sources totaled $2,232,976.35. Of this sum, $331,697.15 was allotted from the rural sanitation funds of the Public Health Service; an aggregate of $1,688,132.69 was derived from State, county, and municipal governmental sources; and $213,146.51 was derived from other sources, including local health associations, tuberculosis associations, local Red Cross chapters, the Rockefeller Foundation, and the Children's Bureau of the United States Department of Labor. Thus this investment of the Federal funds appropriated for rural sanitation work was met with odds of over 5 to 1. For the regular

demonstration projects outside the "flood" counties, the odds were over 10 to 1, as was the case in each of the several preceding fiscal years.

It is significant that organizations entering the public-health field to promote or conduct some specialized activity—such as typhoid fever prevention, hookworm control, tuberculosis prevention, trachoma control, malaria control, venereal disease prevention, school hygiene, or advancement of child and maternity hygiene—realize, as a rule, after practical experience, the advantage of dovetailing their specific activities with and making them a part of a well-rounded comprehensive program of local official health service under the immediate direction of a qualified, whole-time local health officer. Such arrangement is obviously in the interest of efficiency with economy in public health work in our rural districts.

Detailed Data

The expenditures from the different sources for support of the cooperative demonstration projects, the scope, the principal activities, and some of the results of the work are presented in the accompanying tabular statement.

In attempting to measure the efficiency of health service, consideration is to be given to the local conditions—climatic, topographical, geographical, social, economic, and other—under which the work is done, the duration, nature, and scope of the activities, the cost of the service, and the results achieved. The 204 cooperative projects grouped by States in this tabular statement present a wide range of local conditions. From equivalent, well-directed efforts, much larger results are obtainable in one such project than in another. Considering the cost of the service, the activities and results reported, and the findings from direct surveys of the situation by representatives of the Public Health Service and the State boards of health concerned, it is apparent that in the fiscal year 1930 some of the projects were highly successful, others were not up to reasonable expectations, and the average was good.

Counties (or district)	8 in Alabama	21 in Arkansas	3 in California	4 in Georgia	2 in Idaho	1 in Illinois	1 in Iowa	8 in Kansas	30 in Kentucky	24 in Louisiana	1 in Massachusetts	2 in Michigan	12 in Mississippi
Total number of months of operation in fiscal year 1930	96	241	36	48	17	2¼	3	87½	306	289	12	24	144
A. EXPENDITURES													
1. Rural sanitation funds (P. H. S.)	$7,844.88	$75,142.26	$4,049.92	$1,200.00	$3,400.00	$566.67	$75.00	$8,187.50	$70,000.00	$65,039.69	$1,500.00	$3,586.92	$27,639.82
2. State	20,073.44	13,547.91	----	----	3,684.94	340.00	499.98	5,000.00	68,045.87	63,335.57	----	5,801.07	30,798.44
3. County	34,899.55	92,935.54	211,415.75	36,004.80	7,113.39	472.22	792.21	44,110.00	61,850.71	70,770.87	11,780.40	11,776.87	100,901.95
4. Municipalities	10,090.28	----	----	3,991.64	----	----	37.50	1,500.00	----	----	----	----	23,068.57
5. Other agencies	18,921.13	31,028.06	1,100.00	6,319.70	125.00	377.76	654.41	7,400.00	23,733.28	37,207.92	----	7,869.66	11,086.46
Total	96,829.28	212,653.77	216,565.67	47,516.14	14,323.33	1,756.65	2,059.10	66,197.50	223,629.86	236,354.05	13,280.40	29,034.52	193,495.24
B. ACTIVITIES													
1. Educational:													
(a) Lectures	931	3,534	172	229	33	(4)	15	495	620	2,849	45	85	1,801
(b) Attendance	44,217	172,352	7,385	12,064	1,728	----	460	18,588	38,714	101,151	1,710	5,328	107,699
(c) Bulletins distributed	25,128	107,388	13,966	12,630	170	----	1,853	91,920	152,691	103,433	93	2,152	43,142
(d) Newspaper articles	319	1,747	400	263	75	----	9	1,507	1,685	720	53	166	974
(e) Circular letters	20,046	27,202	25,636	3,334	149	----	200	44,953	166	45,080	10	2,950	65,932
(f) Health exhibits	5	559	126	1	----	----	1	26	606	227	----	30	----
2. Sanitary inspections:													
(a) Private premises	16,486	50,706	5,399	55,221	95	----	8	1,504	7,811	24,752	376	153	61,603
(b) Public premises—schools, churches, stores, camps, etc	2,671	14,386	3,072	445	457	----	3	2,973	1,498	5,333	334	205	9,851
3. Special inspections:													
(a) Dairies	1,337	2,866	9,777	472	73	----	----	342	718	1,265	1,596	261	3,585
(b) Other food-producing or food-handling places	2,704	5,434	14,166	486	142	----	----	742	4,264	4,033	443	102	33,494
4. Examinations:													
(a) For life-extension advice	578	1,282	1,651	46	----	----	----	575	----	689	----	178	2,403
(b) For marriage license	707	----	----	----	----	----	----	----	----	104	----	3	----
(c) For work certificates (children)	525	261	32	166	----	----	----	----	----	35	38	6	290
(d) For lunacy	112	387	10	7	----	----	2	40	----	5	1	8	----
(e) Of prisoners	647	1,161	495	46	----	----	----	670	----	23	----	60	----
(f) Of food handlers	295	1,523	358	250	468	----	----	56	----	1,645	42	36	1,075
5. Acute communicable disease control:													
(a) Visits to cases, carriers, contacts, or suspects	1,856	4,344	26,044	1,037	2,108	----	250	6,679	4,245	6,387	618	2,956	2,859
(b) Cases of carriers, isolated or quarantined	1,162	2,871	3,787	307	743	----	18	4,269	1,950	1,652	661	1,368	1,126

[4] Project terminated Sept. 8. Reports on activities and results in period of operation not obtainable.

Counties (or district)	8 in Alabama	21 in Arkansas	3 in California	4 in Georgia	2 in Idaho	1 in Illinois	1 in Iowa	8 in Kansas	30 in Kentucky	24 in Louisiana	1 in Massachusetts	2 in Michigan	12 in Mississippi
Total number of months of operation in fiscal year 1930	96	241	36	48	17	2¼	3	87½	306	289	12	24	144
B. ACTIVITIES—continued													
6. Venereal-disease control.													
(a) Suspects examined	1,830	1,165	1,044	5,037	12		1	146	5,307	301		49	2,620
(b) Prophylactic treatments	1,938	36		45				3		62	1	6	
(c) Curative treatments	3,425	1,000	10,342	23,514				50	6,183	1,618	11	66	1,441
7. Tuberculosis control:													
(a) Number examined	299	1,577	936	155	19		1	313	952	223	7	221	372
(b) Positive	76	424	234	29	8			99	238	99	2	90	91
(c) Negative	223	1,153	702	126	11		1	214	714	124	5	131	281
(d) Placed in institutions	5	74	134	16	2			19	38	80	42	80	26
(e) Home visits	1,301	1,120	967	333	31		3	650	979	1,015	21	589	1,389
8. Persons treated for removal of hookworm	74	309		301					391	1,191			469
9. Persons treated for prevention or cure of goiter	3	56			121			12		23		8	
10. Schick tests	474	50	20		3			95	218	223	44	1,062	13,068
11. Cows tuberculin tested	5,175	3,793	27,829	72				898	3,296	9,689	2,865	12,500	5,348
12. Immunization:													
(a) Complete antityphoid administrations	27,900	29,682	911	11,064	27		1	2,650	82,238	72,730	18	41	21,265
(b) Antismallpox vaccinations	2,076	25,941	6,032	3,467	220			6,637	20,960	19,220	640	4,711	22,150
(c) Complete diphtheria toxin-antitoxin administrations	3,637	13,154	6,110	2,910	3			13,703	41,193	29,419	285	4,111	7,225
(d) Persons given prophylactic diphtheria antitoxin	66	577	10	68	28			212		637	152	32	
(e) Persons given antirabic treatment	43	75	11	4				5	104	113		10	79
13. Child hygiene:													
(a) Prenatal—													
(1) Cases given advice	709	1,000	621	535				525	563	697	101	165	1,164
(2) Examinations	63	257	151	334				22	538	89		60	1,215
(3) Office consultations	124	514	123	475				179		225	38	47	916
(4) Group conferences	171	90	71	109				2		86	24	3	113
(5) Home visits	1,176	1,078	775	537			5	516	619	835	106	1,755	1,116
(6) Midwives instructed	265	3,009	10	520				2	145	3,649			4,207
(b) Infant and preschool—													
(1) Babies and children examined	2,373	5,941	6,564	692	179		172	2,622	2,394	2,487	274	820	7,560
(2) Office consultation, mothers	748	2,581	5,245	838	5		121	2,099		1,142	65	24	7,494
(3) Group conferences with mothers	211	355	361	133			14	178	297	200	28	11	182
(4) Home visits	4,278	3,372	8,212	639			69	2,179	6,358	1,554	494	1,117	5,639
(c) School—													
(1) Children examined	41,847	71,227	16,148	11,531	1,758		208	29,455	80,974	43,555	5,330	9,134	39,683

(2) Found defective	21,401	47,868	7,350	4,003	1,394	-	152	15,363	63,036	32,467	2,488	4,561	25,365
(3) Defects found	28,585	88,435	10,923	4,581	1,604	-	353	27,020	139,323	78,751	2,916	9,622	32,425
(4) Consultations, parents (office and school)	1,248	6,930	5,226	1,266	124	-	4	6,699	-	6,496	173	111	-
(5) Home visits	4,299	6,344	23,699	1,985	765	-	104	5,688	1,866	6,532	452	2,289	7,492
(6) Talks to classes or drills in hygiene	65	2,303	1,625	181	-	-	82	2,363	6,496	3,375	144	975	1,364
(7) Exclusions for communicable diseases	363	2,159	5,065	222	389	-	84	2,336	97	1,219	543	375	593
(d) Nutritional classes—													
(1) Cases attending	-	871	167	270	-		-	-	-	3,227	-	81	-
4. Antimalaria work	[1]	[1]	[3]	[1]	[3]	-	[3]	[3]	[1]	[1]	[3]	[2]	[1]
5. Laboratory examinations:													
(a) Positive	2,463	2,025	4,485	1,902	299	-	15	853	2,859	4,468	365	196	5,260
(b) Negative	7,229	6,074	14,132	5,320	4,573	-	46	2,559	8,575	13,404	1,097	584	15,780
Total	9,692	8,099	18,617	7,222	4,872	-	61	3,412	11,434	17,872	1,462	780	21,040
C. RESULTS													
1. Sanitary privies installed:													
Type—													
(a) Septic or L. R. S.	42	689	-	-	-	-	-	3	-	62	-	-	-
(b) Water-tight vault	-	4	-	-	-	-	-	43	-	7	-	555	-
(c) Bucket and box	219	118	-	-	-	-	-	-	-	20	-	22	-
(d) Pit	1,686	2,946	4	1,171	4	-	1	61	1,401	4,029	34	593	3,068
Total	1,947	3,757	4	1,171	4	-	1	107	1,401	4,118	34	1,170	3,068
2. Privies restored to sanitary type	1,344	791	4	259	28	-	-	142	319	1,945	25	596	4,689
3. Septic tanks installed	169	211	413	150	2	-	1	16	17	338	56	16	315
4. New sewer connections	224	1,601	1,079	899	12	-	-	109	628	1,602	-	20	2,076
5. New water connections	375	1,547	1,027	1,077	2	-	-	115	299	1,095	-	38	959
6. Wells or springs improved	187	728	5	28	11	-	-	181	2,407	1,600	-	13	492
7. Public milk supplies radically improved	6	313	-	36	25	-	-	61	-	187	7	6	309
8. Public food-handling places radically improved	168	613	11	54	97	-	-	209	-	372	3	24	-
9. Places producing foods for sale radically improved	4	283	4	52	81	-	-	28	-	97	-	24	-
10. Dwellings effectively screened against flies and mosquitoes	192	1,032	7	32	1	-	-	-	113	1,646	-	11	-
11. Stables made sanitary	111	152	1	18	18	-	-	26	-	33	6	-	-
12. Nuisances corrected	2,426	8,848	725	129	153	-	2	321	3,982	3,523	80	106	-
13. Convictions for violation of sanitary laws	219	28	12	4	-	-	-	6	-	888	-	-	-
14. Nutritional cases improved	48	1,314	22	170	-	-	-	691	-	881	61	26	-
15. Corrections of physical defects induced:													
(a) In infants	37	419	38	87	37	-	1	88	-	37	-	26	66
(b) In preschool children	369	763	215	113	112	-	4	230	683	170	116	38	264
(c) In school children	5,770	16,419	2,755	622	238	-	3	8,398	15,946	10,565	1,514	707	7,403
(d) In adults	40	520	155	134	33	-	-	62	-	435	-	2	12

[1] Considerable. [2] Little. [3] None.

Counties (or districts)	14 in Missouri	3 in Montana	7 in New Mexico	4 in North Carolina	3 in Oklahoma	1 in South Dakota	25 in Tennessee	1 in Texas	11 sanitary-officer projects and 1 whole-time county health unit in Virginia	1 in Washington	15 in West Virginia	Total
Total number of months of operation in fiscal year 1929	159	36	71	42	36	11	221	12	144	11	173	2,221¾
A. EXPENDITURES												
1. Rural sanitation funds (P. H. S.)	$12,983.34	$5,599.92	$2,249.96	$1,822.84	$4,599.84	$2,200.00	$18,017.45	$2,300.00	$6,080.02	$2,999.57	$4,611.55	$331,697.15
2. State	33,312.86	11,790.00	4,918.73	12,959.61	7,828.60		77,613.35		22,996.46		23,302.10	405,848.93
3. County	79,007.49	24,057.75	46,083.19	16,576.29	12,529.83	6,379.10	110,395.00	8,603.67	24,206.69	13,483.00	116,611.05	1,147,787.32
4. Municipalities	21,397.29	18,422.68		2,047.91		600.00	10,300.00	2,248.78		4,362.20	36,429.59	134,496.44
5. Other agencies	33,097.44	13,029.30	5,075.25	256.25	3,333.24	1,650.00			2,000.00		8,881.65	213,146.51
Total	179,798.42	72,899.65	58,327.13	33,662.90	28,291.51	10,829.10	216,325.80	13,152.45	55,283.17	20,844.77	189,865.94	2,232,976.35
B. ACTIVITIES												
1. Educational:												
(a) Lectures	1,195	87	299	727	332	41	1,345	54	305	48	523	15,765
(b) Attendance	33,515	3,947	16,770	16,406	10,469	648	85,576	4,004	13,576	2,320	34,981	733,608
(c) Bulletins distributed	83,032	11,948	6,459	16,643	8,169	3,270	53,116	230	33,475	1,619	166,392	938,910
(d) Newspaper articles	1,936	267	651	162	120	158	729	65	187	2	1,014	13,209
(e) Circular letters	31,667	2,738	3,584	17,337	1,777	1,011	11,648	591	10,158	17,134	25,574	358,877
(f) Health exhibits	128	146	25	28	175	2	30	10	7	1	2,213	4,346
2. Sanitary inspections:												
(a) Private premises	6,054	2,756	1,269	912	3,887	718	60,960	405	45,627	282	51,643	398,627
(b) Public premises—schools, churches, stores, camps, etc	4,115	1,459	1,731	917	1,349	397	15,354	382	835	838	8,218	76,823
3. Special inspections:												
(a) Dairies	1,701	186	544	143	43	58	2,540	671	171	532	2,588	31,469
(b) Other food-producing or food-handling places	670	1,488	958	851	259	111	3,052	386	230	193	2,762	76,970
4. Examinations:												
(a) For life-extension advice	3,029	101	30	438	1		180			575	164	11,920
(b) For marriage license		33		55								902
(c) For work certificates (children)	45	41		292	12		337				472	2,552
(d) For lunacy	296	5	48	72	56		142				73	1,264
(e) Of prisoners	1,050	19	357	1,211	103	1	619				2,198	8,660
(f) Of food handlers	30	141	1,158	215	9	15	31	85			2,304	9,734
5. Acute communicable disease control:												
(a) Visits to cases, carriers, contacts, or suspects	11,768	5,510	9,849	753	1,974	289	8,042	122	318	2,233	4,608	104,849

(b) Cases or carriers, isolated or quarantined	5,616	3,050	4,087	1,786	521	90	1,520	104	750	1,064	4,340	42,842
6. Venereal-disease control:												
(a) Suspects examined	1,053	158	71	1,834	321		849	93		266	3,077	25,234
(b) Prophylactic treatments	92	4	51				73	22			39	2,372
(c) Curative treatments	6,286	145	72	2,956	1,406		6,533	53		88	22,008	87,227
7. Tuberculosis control:												
(a) Number examined	1,199	66	80	713	132	2	1,867	48	177	82	2,402	11,843
(b) Positive	408	25	18	178	82	1	674	17	19	13	539	3,364
(c) Negative	791	41	62	535	50	1	1,193	31	158	69	1,863	8,479
(d) Placed in institutions	193	27	4	51	36		143	1	9	2	312	1,294
(e) Home visits	4,216	391	194	156	306		6,735	229		526	3,432	24,583
8. Persons treated for removal of hookworm				86			206				8	3,035
9. Persons treated for prevention or cure of goiter	67	218	50				9				581	1,148
10. Schick tests	1,599	61	150	384			3,951		279	382	1,553	23,616
11. Cows tuberculin tested	2,070	886	6,913	258	1,140	623	11,502	2,124	84		12,421	109,496
12. Immunization:												
(a) Complete antityphoid administrations	2,132	7,072	1,457	9,338	12,492		72,591	247	585	13	40,547	395,201
(b) Antismallpox vaccinations	25,607	1,010	5,556	12,055	4,615	428	24,702	1,429	284	3,293	28,707	219,740
(c) Complete diphtheria toxin-antitoxin administrations	4,239	1,714	3,533	6,457	4,985	11	23,519	196	1,798	4,430	38,812	211,444
(d) Persons given prophylactic diphtheria antitoxin	420	141	706	48	73		348	1		22	298	3,839
(e) Persons given antirabic treatment	88	2,081	2	15	26		255		6		60	2,977
13. Child hygiene:												
(a) Prenatal—												
(1) Cases given advice	978	52	531	968	207		996	214		50	2,253	12,329
(2) Examinations	165	6	200	196	4			14		29	43	3,386
(3) Office consultations	487	28	167	78	58		143	116		23	63	3,804
(4) Group conferences	42	10	93	26	12		256	14	12	10	141	1,285
(5) Home visits	1,097	91	357	1,266	75		2,308	250	17	181	587	14,747
(6) Midwives instructed	37		87	491	30		126	297			5	12,880
(b) Infant and preschool—												
(1) Babies and children examined	7,713	1,917	2,355	2,732	307	426	2,044	518	691	331	3,993	55,305
(2) Office consultations, mothers	3,041	1,203	617	307	278		4,271	252		118	1,016	31,465
(3) Group conferences with mothers	584	31	139	399	115		1,900	53	3	16	1,714	6,924
(4) Home visits	4,114	600	3,188	2,112	583	3	5,491	1,005	86	549	7,994	59,636
(c) School—												
(1) Children examined	48,805	14,814	11,045	8,573	13,611	5,191	18,753	2,236	5,485	7,631	63,652	550,647
(2) Found defective	27,645	7,989	4,717	4,201	10,824		16,648	799	4,124	1,485	46,236	350,166
(3) Defects found	46,309	15,433	6,220	5,184	15,797	2,690	27,617	1,375	5,517	2,046	90,858	643,587
(4) Consultations, parents (office and school)	3,663	782	1,049	520	747		658	207	87	193	4,902	41,085
(5) Home visits	4,827	7,984	1,208	712	609	750	5,148	848	605	491	3,879	88,576
(6) Talks to classes or drills in hygiene	2,070	227	398	130	271	202	2,089	454	3	21	1,676	26,514
(7) Exclusions for communicable diseases	3,772	1,343	1,864	877	460	192	1,433	306		680	1,081	25,453
(d) Nutritional classes—												
(1) Cases attending	266	253	328	234	51		60			2,609	50	8,467
14. Antimalaria work	(1)	(2)	(1)	(1)	(1)	(3)	(1)	(1)	(1)	(3)	(2)	

[1] Considerable. [2] Little. [3] None.

Counties (or districts)	14 in Missouri	3 in Montana	7 in New Mexico	4 in North Carolina	3 in Oklahoma	1 in South Dakota	25 in Tennessee	1 in Texas	11 sanitary-officer projects and 1 whole-time county health unit in Virginia	1 in Washington	15 in West Virginia	Total
Total number of months of operation in fiscal year 1929	159	36	71	42	36	11	221	12	144	11	173	2,221¾
B. ACTIVITIES—continued												
15. Laboratory examinations:												
(a) Positive	325	704	1,742	694	153	30	10,707	256	697	338	3,257	44,093
(b) Negative	7,530	2,189	7,373	2,130	369	90	31,919	767	2,089	3,091	9,093	146,013
Total	7,855	2,893	9,115	2,824	522	120	42,626	1,023	2,786	3,429	12,350	190,106
C. RESULTS												
1. Sanitary privies installed: Type—												
(a) Septic or L. R. S.	34	10									202	1,043
(b) Water-tight vault	23	16			33	2					551	1,234
(c) Bucket and box	57			151	224				395		123	1,329
(d) Pit	409	9	59	1,005	173		6,670	65	8,643		1,230	33,261
Total	523	35	59	1,156	430	2	6,670	65	9,038		2,106	36,867
2. Privies restored to sanitary type	665	50	184	1,611	270	17	6,401	21	2,502		4,687	26,550
3. Septic tanks installed	272	22	29	3	91	2	501	17	802		200	3,643
4. New sewer connections	443	306	365	77	61	89	1,124	113	672		1,057	12,557
5. New water connections	402	253	652	56	14	141	639	85	492		1,718	10,986
6. Wells or springs improved	292	23	63	23	23	8	864	19	259	1	451	7,677
7. Public milk supplies radically improved	236	40	78	4	13	8	242	42	4	28	156	1,801
8. Public food-handling places radically improved	217	68	138		388	14	520	56	207	60	161	3,380
9. Places producing foods for sale radically improved	24	41	47	175	119	12		23		17	36	1,067
10. Dwellings effectively screened against flies and mosquitoes	326		286		8		1,240	36		1	509	5,440
11. Stables made sanitary	47	5	72	24	33	3	97	19		3	209	877
12. Nuisances corrected	1,754	2,444	612	116	1,483	53	8,366	139	635	191	1,934	38,072
13. Convictions for violation of sanitary laws	11	20	4	40		2	126	9	1	2	6	1,378
14. Nutritional cases improved	1,081	656	525	109	111			6		705	256	6,662
15. Corrections of physical defects induced:												
(a) In infants	464	59	731	2	11		31	12	88	2	127	2,361
(b) In preschool children	339	218	296	442	24		172	42	605	90	267	5,572
(c) In school children	7,157	5,897	1,896	3,139	1,408		4,651	172	1,757	810	7,186	104,431
(d) In adults	409	17	553	26	32			6	925	1	382	3,447

A detailed description of any one of a large majority of the projects would present evidence of the remarkable effectiveness and economy of this plan of cooperative health work.

Sanitary Officer Projects in Virginia and Tennessee Counties

The plan of special demonstration work in rural sanitation inaugurated in Virginia in the fiscal year 1920 was carried out in 11 counties [6] in that State and in 8 counties [7] in Tennessee in the fiscal year 1930. This plan, which is described in previous reports,[8] continues to prove highly successful. It meets remarkably well the situations in rural counties in which effective health work, if done at all, must be done on a low-cost basis and in which environmental sanitation is especially needed. The cost for such service in the average county is about $2,750 a year. The county sanitary officer is engaged on a whole-time basis. He does not have to be a graduate in medicine or engineering, but he must be a trained, practical sanitarian. Along with his sanitary work, he carries out, with the active cooperation of the local physicians, most of the other activities expected of a whole-time county health officer with a medical degree.

The results accomplished in the county sanitary officer projects become more impressive from year to year. Some of these counties are now among the foremost in the list of rural counties in the United States presenting high-grade demonstrations in sanitary progress.

In the 11 projects in Virginia there were brought about within the fiscal year 1930, notwithstanding the extensive sanitary improvements in previous years of operation, radical sanitary improvement of 10,187 excreta disposal systems at homes or public places—an average of 77 per man per month for the sanitary officers engaged in the work. After projects of two years' duration in Powhatan and Alleghany Counties, over 99 per cent of the homes are reported to be provided with sanitary excreta disposal systems.

Of the 12 county sanitary officer projects established in Tennessee within the last 5 years, 9 have been reorganized with increased local appropriations to become health units or parts of 2-county or 3-county health units headed by whole-time county health officers.

This county sanitary officer plan, after 11 years of testing, appears to offer to the counties to which it is appropriate as large a return on the investment for county health service as any other yet tried or proposed.

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[6] Alleghany, Bath, Charlotte, Chesterfield, Pittsylvania, Powhatan, Prince Edward, Pulaski, Roanoke, Smyth, and Washington.

[7] Bledsoe, Cumberland, Grundy, Fentress, Overton, Pickett, Sequatchie, and Unicoi.

[8] Reprint No. 615, from Public Health Reports of Oct. 1, 1920, pp. 10, 12; Reprint No. 699, from Public Health Reports of Oct. 7, 1921, pp. 12, 14, Reprint No. 788, from Public Health Reports of Sept. 22, 1922, pp. 14, 17; Reprint No. 877, from Public Health Reports of Dec. 14, 1923, pp. 16, 18; Reprint No. 964, from Public Health Reports of Oct. 17, 1924, pp. 18, 21; Reprint No. 1047, from Public Health Reports of Oct. 23, 1925, pp. 27, 28; Reprint No. 1118, from Public Health Reports of Oct. 22, 1926, pp. 31, 32; Reprint No. 1184, from Public Health Reports of Oct. 21, 1927, pp. 35, 36; Reprint No. 1259, from Public Health Reports of Nov. 30, 1928, pp. 41, 45; Reprint No. 1339, from Public Health Reports of Dec. 6, 1929, pp. 15, 16.

General Progress in Rural Health Work

Progress in the development of whole-time rural (county) health service in the United States continued in the fiscal year 1930. According to data [9] collected from the State health departments, the number of counties or equivalent divisions provided with local health service reaching all rural sections thereof, under the direction of whole-time county or district health officers, was 505 at the beginning of the calendar year 1930, as compared with 467, 414, 337, 307, 280, 250, 230, 202, 161, and 109 at the beginning of the calendar years 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1922, 1921, and 1920, respectively. The gain of 396 within this 10-year period, though much less than it might have been had means been provided for a larger degree of cooperation from the Federal and State official agencies is significant.

Our public-health administrators generally now appear convinced that local official health service under the direction of a whole-time local health officer is the most essential element in the development of an adequate system of effective and economical public-health service in the United States, and that most of the work of the Federal and State health agencies should be conducted with and through such local health departments. The principle of cooperative rural health work appears sound in theory and is successful in practice. State health departments in increasing number from year to year are obtaining authorization and appropriations to enable them more nearly to do their due and proportionate part in the development and maintenance of whole-time county health service.

In this vitally important field of activity the 10-year period following the establishment in 1911 of our first county health unit under the direction of a whole-time county health officer [10] may be regarded as the period of experimentation, the next 10-year period as that of demonstration, and the third 10-year period (to begin in 1931) in this public-health era should be, and according to the signs will be, the period of cooperative development.

The progress made in the construction of good public roads, in the provision of improved public-school facilities, and in other important governmental enterprises in our rural communities generally within the last 30 years furnishes a basis of optimism for an increased rate of development in efficient, economical, whole-time official county health service in this country in the decade 1930–1940.

It appears at this time that of all the fields of activity in which governmental and other agencies may operate for the promotion of the welfare of our people, no other field offers greater net advantages than does that of rural health service. With a marked increase in such service, there would no longer be an excuse for the numerous

[9] Reprint No. 1372 from Public Health Reports of May 9, 1930.
[10] In Yakima County, Wash.

makeshifts or expedients in rural health work programs which, though comparatively expensive and ineffective, are now supported by many of our public health minded citizens.

It has become more and more evident in the course of various health-promotion campaigns tried out in the United States during the last 25 years that the organization of whole-time county or local district health units with qualified personnel is fundamental to any and all efficient economical health service in our rural communities.

Field forces, State or national, concerned with specialized health activities such as those for the prevention of tuberculosis, malaria, or pellagra, or for the promotion of maternity, infant, preschool child, or school-child hygiene, can operate best when and where they can cooperate with such units. On January 1, 1930, an officer of the Public Health Service, who had had during several previous years intensive experience in malaria control work, was detailed for duty with the rural sanitation field force. His work is to help in the development of effective, economical malaria-control programs as due and proportionate parts of the general program of activities of whole-time health units in the Mississippi Valley. His cooperative activities with the personnel of these health units have resulted in the development of effective and remarkably low-cost antimalaria work in a number of counties in which previously malaria control had been regarded as practically hopeless. The field force of the Public Health Service engaged in trachoma control work has been of great assistance to a number of the cooperative county health units in carrying out practical activities for the diagnosis, treatment, and prevention of trachoma and other eye diseases.

It is evident that along with the anticipated extension of whole-time county health units throughout this country there will be not a contraction but an expansion of the field of usefulness for specialized health workers in our rural communities.

The provision of means to enable the Federal and the State official health agencies to apply coordinately and on an adequate scale their efforts for the organization of efficient whole-time local health service units would appear altogether advantageous. Among the results of such service are lowering of disease and death rates, promotion of general health, and net gain in economic conditions. A recent report by the director of the bureau of rural sanitation of the State board of health of Mississippi presents impressive evidence of the lowering of morbidity and mortality rates as a result of whole-time county health service in that State. According to the records for the calendar years 1927 and 1928, the combined case rate for diphtheria, scarlet fever, typhoid fever, and smallpox was 34 per cent lower and the combined death rate for those same diseases was 44 per cent lower in the aggregate population of about 700,000 in the counties provided

with whole-time county health service than in the aggregate population of about 1,090,000 in the counties with part-time county health service.

In Tennessee, for the 3-year period 1927–1929, the recorded death rate from diphtheria was about 20 per cent lower and that from typhoid fever about 40 per cent lower in the aggregate population of the counties provided with whole-time county health service than in that of the counties not provided with such service.

During the flood disasters in the Mississippi Valley in the spring and summer of 1927 the advantages of previously operating whole-time county health departments were definitely demonstrated. In the flood-stricken counties provided with such departments the whole-time health officers, as a rule, acted with remarkable promptness and efficiency in the organization of working forces and in the carrying out of measures for both immediate and postflood sanitary protection of the stricken people. The contrast between this work in the minority of the counties which had whole-time county health departments and in those not so provided stood out sharply. Since the flood, cooperative agencies, including the United States Public Health Service, the Rockefeller Foundation, and the State health departments directly concerned have helped to develop whole-time county health departments in the (approximately) 90 flood-stricken counties which did not have such organizations at the time of the flood. This undertaking has been attended with a number of practical difficulties, such as obtaining comparatively small appropriations from the hard-pressed county governments for the support of the budgets and securing promptly satisfactory personnel to fill the positions in the county health departments for which financial provision has been made.

Notwithstanding the difficulties of development, a large majority (over three-fourths) of the so-called flood counties are now provided with whole-time health service under the direction of whole-time county health officers. In the average project the work is being carried out with a good degree of efficiency and with results remarkably appreciated by the citizens generally of the counties immediately benefited. Some of these counties were again visited by floods in 1928 and 1929, and all of them suffered from an unprecedented drought in the summer of 1930, but the local authorities, notwithstanding the repeated depressions in economic conditions, have shown in only a very few instances a disposition to have the health units discontinued. They appreciate the profit realized on their investment for the health work.

From all the evidence now at hand, the prophecy is made that if the health service now operating in these flood counties be continued even at its present grade of efficiency for the next three years the net

economic gain from this health service in the 6-year period will more than offset the economic loss from the Mississippi Valley flood of 1927.

Whole-time county health departments as usually organized, in order to be satisfactorily effective in time of disaster, must be in full operation before the disaster. They can not, as a rule, be organized and put on an operating basis of high efficiency within a few days or even a few weeks to meet an unusual critical situation. In view of the preventable-disease disaster with which all the populated counties of the United States not provided with efficient health service are frequently or constantly visited, there appears ample cause for the employment of every reasonable and feasible means to bring about an increased rate of development of efficient whole-time county health service in every section of the United States.

Summary

The 205 cooperative projects in the fiscal year ended June 30, 1930, yielded results exceeding in value many fold the cost of the work. Among the activities and results presented in the tabular statement, to which especial consideration may be given, are the following:

1. Public lectures presenting the principles and details of sanitation to over 733,608 persons.

2. Over 475,460 sanitary inspections of premises, with explanation of findings to occupants or owners of the properties.

3. Physical examination of over 550,647 school children of whom 350,166 were found to have incapacitating physical defects, with notification to parents or guardians of the defects found.

4. Exclusion from public schools of 25,453 children affected with communicable diseases—such as diphtheria, scarlet fever, measles, whooping cough, scabies, and pediculosis—or presenting evidence of being carriers of the contagions of such diseases. This was brought about through active cooperation of school teachers with the county health departments, and it must have been a very considerable factor in preventing widespread infection.

5. One hundred and four thousand four hundred and thirteen recorded treatments effecting correction of incapacitating physical defects among school children. These were brought about by written notification to parents or guardians of defects found, follow-up visits to homes of the children, making available proper clinical facilities, securing active cooperation of the local medical and dental professions, and other activities of the county or district health departments.

6. Bringing about treatments for correction of serious physical defects in 2,361 infants and 5,572 preschool children.

7. Treatments to correct iodine deficiency in 1,148 persons in endemic goiter districts.

8. One hundred and four thousand eight hundred and forty-nine visits to homes of cases of communicable diseases to advise and show the afflicted households how to prevent spread of the infections.

9. Nineteen thousand eight hundred and thirty-six visits by health nurses or health officers to prenatal cases to advise and assist expectant mothers in carrying out hygienic and physiological measures making for healthy mothers and healthy babies.

10. Instruction of 12,880 midwives in cleanly and careful methods.

11. Fifty-five thousand three hundred and five infants and children of preschool age examined and over 59,636 home visits by health nurses or health officers to demonstrate hygienic measures for the promotion of the health and the protection of the lives of infants.

12. Three hundred and ninety-five thousand two hundred and one persons given immunization injections for protection against typhoid fever.

13. Two hundred and nineteen thousand seven hundred and forty persons vaccinated against smallpox.

14. Two hundred and eleven thousand four hundred and forty-four children treated with toxin-antitoxin mixture for immunization against diphtheria.

15. One hundred and nine thousand four hundred and ninety-six cows tuberculin tested, with elimination of reactors from herds to prevent communication of bovine tuberculosis to persons through the medium of milk.

16. Three thousand and thirty-five persons treated effectively for relief from hookworm disease and for the prevention of the spread of the infection.

17. Marked reduction in the spread of malaria in hundreds of localities, with an aggregate population of several hundred thousand.

18. Eighty-seven thousand two hundred and twenty-seven treatments to rid persons of venereal disease infection and prevent the spread of the infection.

19. Special examination of 11,843 persons for tuberculosis, of whom 3,364 were found with an active tubercular process and were advised to place themselves in the care of private physicians and to carry out hygienic measures. One thousand two hundred and ninety-four of the positive cases were sent to institutions maintained in whole or in part for the treatment of tuberculosis.

20. Forty-two thousand eight hundred and forty-two cases of dangerous communicable diseases quarantined to prevent the spread of infection in the local community, the State, and throughout the country.

21. The installation of 36,867 sanitary privies and 3,643 septic tanks at dwellings where previously there had been either insanitary privies or no toilets of any sort.

22. Twenty-six thousand five hundred and fifty privies repaired so as again to be of sanitary type.

23. Twelve thousand five hundred and fifty-seven homes connected for the first time with sanitary sewers.

24. Ten thousand nine hundred and eighty-six homes provided with safe water supplies in place of contaminated water supplies.

25. Radical improvement in 1,801 public milk supplies (from which milk is distributed to a considerable extent through the channels of interstate commerce) to prevent the spread, through milk and milk products, of various infections, including typhoid fever, scarlet fever, undulant fever, diphtheria, tuberculosis, septic sore throat, and infant diarrhea.

26. Eleven thousand nine hundred and twenty adult persons (most of them over 40 years of age) examined and advised about measures to conserve their health and prolong their lives.

Such activities and results indicate that the plan of the work is both comprehensive and effective. Considered from both a public health and an economic standpoint, the total result of such work stands in importance to our national welfare second to none other obtainable from equivalent investment of public funds.

DEATHS DURING WEEK ENDED OCTOBER 4, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended October 4, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Oct. 4, 1930	Corresponding week, 1929
Policies in force	75, 450, 406	74, 833, 510
Number of death claims	12, 460	12, 494
Death claims per 1,000 policies in force, annual rate	8. 6	8. 7

Deaths [1] from all causes in certain large cities of the United States during the week ended October 4, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Oct. 4, 1930				Corresponding week, 1929		Death rate [2] for first 40 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (78 cities)	6,642	10.0	647	[4] 52	10.8	695	12.0	12.8
Akron	46	9.4	5	46	6.8	3	8.0	9.5
Albany [5]	24	9.8	3	62	16.1	2	14.9	16.5
Atlanta	61	11.9	9	92	14.1	5	15.9	16.2
White	25		4	63		2		
Colored	36	(6)	5	144	(6)	3	(6)	(6)
Baltimore [5]	167	10.8	21	73	12.4	24	14.1	14.8
White	121		14	62		17		
Colored	46	(6)	7	112	(6)	7	(6)	(6)
Birmingham	61	12.3	3	29	12.6	5	13.9	16.3
White	26		0	0		3		
Colored	35	(6)	3	73	(6)	2	(6)	(6)
Boston	174	11.6	24	70	11.0	18	14.1	15.2
Bridgeport	22	7.8	0	0	10.3	3	11.0	12.3
Buffalo	119	10.8	11	49	12.5	16	13.1	14.2
Cambridge	32	14.7	6	121	8.7	4	11.8	12.6
Camden	24	10.7	1	18	12.0	4	13.8	14.6
Canton	14	6.9	1	27	17.0	4	9.9	11.6
Chicago [5]	581	8.9	50	44	9.8	53	10.5	11.4
Cincinnati	116	13.4	21	124	16.8	13	15.7	17.3
Cleveland	163	9.4	19	57	9.5	19	11.2	12.6
Columbus	62	11.1	5	49	12.9	10	15.7	15.0
Dallas	37	7.3	5		10.5	5	11.5	11.7
White	30		4			3		
Colored	7	(6)	1		(6)	2	(6)	(6)
Dayton	37	9.6	4	60	12.5	3	10.7	11.7
Denver	74	13.4	7	76	10.8	7	14.8	14.9
Des Moines	31	11.3	3	55	12.5	4	11.8	11.8
Detroit	264	8.7	35	54	9.2	39	9.4	11.4
Duluth	21	10.8	2	54	14.4	1	11.3	11.8
El Paso	29	14.8	11		13.0	3	17.6	20.0
Erie	26	11.7	3	66	10.0	0	11.3	12.6
Fall River [5] [7]	17	7.8	0	0	10.0	2	12.1	14.0
Flint	25	8.3	6	71	10.6	9	9.3	10.9
Fort Worth	31	10.0	4		10.5	5	11.3	12.6
White	25		4			5		
Colored	6	(6)	0		(6)	0	(6)	(6)
Grand Rapids	20	6.2	1	15	9.1	4	10.4	10.2
Houston	67	11.9	6		12.6	7	12.3	12.8
White	44		5			4		
Colored	23	(6)	1		(6)	3	(6)	(6)
Indianapolis	105	15.0	3	23	12.1	9	14.8	14.9
White	86		3	26		9		
Colored	19	(6)	0	0	(6)	0	(6)	(6)
Jersey City	53	8.7	7	61	10.3	2	11.3	12.7
Kansas City, Kans	29	12.3	2	47	11.6	4	11.6	13.4
White	24		1	28		2		
Colored	5	(6)	1	152	(6)	2	(6)	(6)
Kansas City, Mo	85	11.2	3	25	11.8	11	13.5	14.1
Knoxville	18	8.8	2	47	12.6	1	13.7	13.9
White	13		2	52		1		
Colored	5	(6)	0	0	(6)	0	(6)	(6)
Los Angeles	194	8.1	18	54	9.2	19	11.1	11.4
Louisville	66	11.2	6	51	14.6	13	13.6	15.1
White	57		6	59		11		
Colored	9	(6)	0	0	(6)	2	(6)	(6)
Lowell [7]	23	12.0	5	132	8.2	0	13.5	14.3
Lynn	19	9.7	2	56	14.8	5	10.5	11.6
Memphis	50	10.3	8	94	14.8	11	17.3	19.3
White	27		3	54		5		
Colored	23	(6)	5	168	(6)	6	(6)	(6)
Milwaukee	98	9.0	11	48	8.7	13	9.8	11.2
Minneapolis	85	9.5	3	20	8.3	4	10.7	10.9
Nashville	51	18.1	8	126	13.9	1	17.5	19.0
White	34		2	42		1		
Colored	17	(6)	6	373	(6)	0	(6)	(6)

See footnotes at end of table.

Deaths [1] *from all causes in certain large cities of the United States during the week ended October 4, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929*—Continued

City	Week ended Oct. 4, 1930				Corresponding week, 1929		Death rate [2] for first 40 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
New Bedford [7]	24	11.1	0	0	11.0	3	10.9	12.5
New Haven	37	11.9	7	108	13.5	1	12.8	13.4
New Orleans	134	15.3	15	83	16.3	19	17.6	17.8
White	86		8	68		8		
Colored	48	(6)	7	113	(6)	11	(6)	(6)
New York	1,120	8.4	99	42	9.4	112	10.8	11.4
Bronx Borough	146	5.9	10	29	6.9	10	7.9	8.3
Brooklyn Borough	379	7.6	41	43	8.4	38	9.8	10.3
Manhattan Borough	420	11.8	32	41	13.3	53	16.2	16.6
Queens Borough	133	6.3	13	52	7.5	8	7.1	7.7
Richmond Borough	42	13.8	3	58	13.2	3	14.5	16.1
Newark, N. J	92	10.8	10	52	9.7	7	12.0	12.9
Oakland	67	12.2	3	37	11.4	3	11.0	11.5
Oklahoma City	28	7.9	2	36	12.7	8	10.9	10.8
Omaha	66	16.0	3	36	10.5	2	13.7	13.8
Paterson	36	13.6	6	105	10.6	1	12.4	13.5
Philadelphia	397	10.5	36	53	11.1	41	12.6	13.3
Pittsburgh	137	10.6	18	64	13.9	18	13.8	15.0
Portland, Oreg	58	10.1	2	25	9.5	1	12.2	12.8
Providence	65	13.5	7	65	9.6	5	13.2	14.7
Richmond	39	11.1	2	29	13.7	2	14.9	16.4
White	26		1	22		1		
Colored	13	(6)	1	43	(6)	1	(6)	(6)
Rochester	58	9.3	2	18	9.8	4	11.6	12.5
St. Louis	156	9.9	12	42	12.6	13	14.2	14.8
St. Paul	48	9.2	2	20	8.6	5	10.1	10.5
Salt Lake City [5]	21	7.8	0	0	13.2	4	12.2	13.1
San Antonio	39	7.9	4		10.9	6	15.2	14.6
San Diego	35	12.2	3	63	13.8	3	14.4	15.3
San Francisco	148	12.3	6	41	9.7	7	13.3	13.2
Schenectady	23	12.5	3	93	7.7	1	11.4	12.4
Seattle	71	10.2	2	20	12.9	7	10.9	11.1
Somerville	19	9.5	1	32	8.1	1	9.8	9.4
Spokane	29	13.1	2	52	12.7	1	12.4	13.0
Springfield, Mass	34	11.8	2	34	13.7	3	12.2	13.0
Syracuse	41	10.3	3	37	9.2	6	11.7	13.3
Tacoma	21	10.2	1	27	16.2	0	12.5	11.9
Toledo	70	12.5	12	110	11.4	8	12.7	13.7
Trenton	35	14.9	4	77	17.9	4	16.7	17.3
Utica	22	11.2	1	28	9.2	2	14.7	15.5
Washington, D. C	113	12.1	17	100	13.5	11	15.2	15.5
White	75		8	70		7		
Colored	38	(6)	9	161	(6)	4	(6)	(6)
Waterbury	14	7.2	1	24	9.9	5	9.7	9.5
Wilmington, Del. [7]	24	11.9	6	145	9.4	2	14.7	14.0
Worcester	43	11.4	3	42	10.2	7	12.8	12.7
Yonkers	23	8.8	1	24	7.1	2	8.1	9.4
Youngstown	34	10.4	5	72	11.9	5	10.3	12.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended October 11, 1930, and October 12, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 11, 1930, and October 12, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929
New England States:								
Maine	2	4	7			4	0	0
New Hampshire	10	2				14	0	0
Vermont	4	2					0	0
Massachusetts	47	61	6	6	28	22	1	2
Rhode Island	25	12		2	1		0	2
Connecticut	5	15	2	34	9		0	0
Middle Atlantic States:								
New York	75	115	[1] 7	[1] 14	52	66	10	5
New Jersey	63	96	5	3	34	8	2	2
Pennsylvania	90	139			52	156	2	14
East North Central States:								
Ohio	44	90	8	23	10	113	3	4
Indiana	41	33	4		2	2	3	0
Illinois	131	131	24	10	17	93	3	7
Michigan	47	92	1	3	36	73	10	14
Wisconsin	24	24	25	16	67	78	3	3
West North Central States:								
Minnesota	13	22		1	7	15	1	1
Iowa	9	4		1	4	11	1	1
Missouri	43	54	2	4	32	17	3	5
North Dakota	2				8	5	0	2
South Dakota	13	8			1		1	0
Nebraska	9	2		2	7	25	0	1
Kansas	18	33	1	1	1	36	1	1
South Atlantic States:								
Delaware					1		0	0
Maryland [2]	32	25	5	8	5	4	1	0
District of Columbia	22	9			2	1	0	0
Virginia								
West Virginia	28	31	8	20	15	3	0	0
North Carolina	173	245	10		3	4	0	5
South Carolina	58	81	251	377			3	0
Georgia	21	35	24	60	10	2	0	0
Florida	13	15			1	1	0	0
East South Central States:								
Kentucky	9	24			37		0	1
Tennessee	60	64	16	10	6	2	8	0
Alabama	62	89	20	23	28	11	1	1
Mississippi	38	81					0	1

[1] New York City only. [2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 11, 1930, and October 12, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929
West South Central States:								
Arkansas	12	16	15	41	1		0	0
Louisiana	14	31	1	16	1		0	3
Oklahoma [3]	51	69		38	4	11	3	0
Texas	25	91	12	21	2	2	0	1
Mountain States:								
Montana	6	2				198	1	2
Idaho					6	2	0	2
Wyoming	1	1				1	0	0
Colorado	7	5			27	3	1	0
New Mexico	11	5			5		1	0
Arizona	9	11	1		9	2	4	0
Utah [2]	2		4		1	1	0	4
Pacific States:								
Washington	22	8		2	2	12	1	4
Oregon	2	11	6	15	21	5	2	2
California	55	52	26	26	62	41	3	4

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929
New England States:								
Maine	16	0	6	46	0	0	5	4
New Hampshire	2	0	2	25	0	0	0	3
Vermont	0	4	2	6	0	7	0	0
Massachusetts	53	10	87	100	0	0	9	9
Rhode Island	2	1	5	6	0	0	1	0
Connecticut	10	0	16	22	0	0	11	4
Middle Atlantic States:								
New York	51	27	111	70	0	9	35	33
New Jersey	9	3	49	40	0	0	11	10
Pennsylvania	9	18	141	142	0	0	139	44
East North Central States:								
Ohio	56	12	174	163	3	18	49	26
Indiana	14	0	81	38	8	21	15	10
Illinois	27	5	193	241	9	62	28	34
Michigan	15	17	119	113	2	25	33	8
Wisconsin	16	0	62	30	0	5	3	27
West North Central States:								
Minnesota	13	3	33	63	3	1	1	3
Iowa	21	4	39	43	15	23	2	2
Missouri	27	0	42	51	10	4	24	12
North Dakota	0	0	12	19	3	5	4	3
South Dakota	24	0	8	4	5	7	1	0
Nebraska	15	0	14	17	9	7	6	1
Kansas	57	2	41	63	3	1	13	7
South Atlantic States:								
Delaware	0	0	4	4	0	0	10	0
Maryland [2]	3	0	33	45	0	0	54	28
District of Columbia	1	0	10	7	0	0	5	1
Virginia		17						
West Virginia	3	3	48	34	1	3	58	35
North Carolina	1	2	109	116	0	6	23	14
South Carolina	1	6	22	29	0	0	46	23
Georgia	3	1	32	44	0	0	37	33
Florida	0	0	6	9	1	0	3	0
East South Central States:								
Kentucky	3	0	27	30	5	3	30	23
Tennessee	5	3	54	46	2	0	41	19
Alabama	3	1	66	70	1	0	15	10
Mississippi	2	0	26	30	1	0	19	22

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 11, 1930, and October 12, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929	Week ended Oct. 11, 1930	Week ended Oct. 12, 1929
West South Central States:								
Arkansas	4	0	7	13	5	1	45	38
Louisiana	3	0	9	22	0	0	21	24
Oklahoma [3]	6	0	27	48	2	8	36	31
Texas	10	1	11	28	11	20	11	10
Mountain States:								
Montana	1	0	26	3	0	9	5	37
Idaho	0	0	6	1	0	1	5	0
Wyoming	2	0	4	2	0	0	0	0
Colorado	4	0	8	15	1	9	19	5
New Mexico	2	0	9		1	0	19	23
Arizona	1	0	3	2	0	0	13	2
Utah [2]	0	1	11	9	0	1	1	4
Pacific States:								
Washington	1	1	40	20	10	17	12	14
Oregon	0	2	11	11	0	1	3	7
California	57	4	75	137	22	16	13	15

[2] Week ended Friday. [3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM CITIES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Cerebrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August, 1930										
Florida	3	11	3	77	2	2	0	11	0	21
September, 1930										
Arizona	5	25	4		11	1	2	23	1	27
Connecticut	6	25	9		12		16	54	0	17
District of Columbia		44	2		23	1	1	13	0	15
Indiana	13	58	8	1	9		39	128	73	54
New Mexico	5	16		140	9	5	5	19	1	62
South Carolina		267	545	2,099	7	284	7	57	0	165
Tennessee	11	91	20	162	31	35	13	126	6	208

August, 1930

	Cases
Florida:	
Chicken pox	5
Mumps	22
Typhus fever	11
Whooping cough	12

September, 1930

	Cases
Actinomycosis:	
Connecticut	1
Chicken pox:	
Connecticut	23
District of Columbia	2
Indiana	34
New Mexico	1
South Carolina	26
Tennessee	20
Dengue:	
South Carolina	10
Diarrhea:	
South Carolina	568
Dysentery:	
Arizona	5
Tennessee	18
German measles:	
Connecticut	7
Hookworm disease:	
South Carolina	125
Impetigo contagiosa:	
Tennessee	9
Lethargic encephalitis:	
Connecticut	1
District of Columbia	1

Lethargic encephalitis—Continued.	Cases
South Carolina	3
Tennessee	1
Mumps:	
Arizona	4
Connecticut	25
Indiana	4
New Mexico	12
South Carolina	28
Tennessee	5
Ophthalmia neonatorum:	
South Carolina	5
Paratyphoid fever:	
South Carolina	4
Puerperal fever:	
Tennessee	1
Rabies in animals:	
Connecticut	8
South Carolina	8
Tennessee	10
Rabies in man:	
Connecticut	1
Septic sore throat:	
Connecticut	2
Tetanus:	
Connecticut	1
Tennessee	1
Trachoma:	Cases
Arizona	21
Indiana	2
Tennessee	10
Trichinosis:	
Connecticut	1
Tularaemia:	
New Mexico	2
Typhus fever:	
Connecticut	1
District of Columbia	1
South Carolina	5
Undulant fever:	
Arizona	1
Indiana	3
South Carolina	1
Tennessee	1
Vincent's angina:	
Tennessee	4
Whooping cough:	
Arizona	33
Connecticut	120
District of Columbia	8
Indiana	56
New Mexico	16
South Carolina	114
Tennessee	50

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,615,000. The estimated population of the 89 cities reporting deaths is more than 30,132,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended October 4, 1930, and October 5, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,227	1,780	
95 cities	374	583	765
Measles:			
45 States	641	793	
95 cities	114	99	
Meningococcus meningitis:			
46 States	77	103	
95 cities	32	51	
Poliomyelitis:			
46 States	647	143	
Scarlet fever:			
46 States	1,682	1,953	
95 cities	447	600	550
Smallpox:			
46 States	175	275	
95 cities	5	40	8
Typhoid fever:			
46 States	933	773	
95 cities	123	97	133
Deaths reported			
Influenza and pneumonia:			
89 cities	364	470	
Smallpox:			
89 cities	0	0	

City reports for week ended October 4, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	1	0	0		0	0	0	2
New Hampshire:								
Concord	0	0	0		0	0	0	0
Nashua	0	0	2		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	0	0		0	0	0	0
Massachusetts:								
Boston	8	23	10		0	11	3	4
Fall River	1	3	2		0	1	0	0
Springfield	11	4	1		0	1	1	0
Worcester	1	4	4	1	0	0	0	0
Rhode Island:								
Pawtucket	0	1	0		0	0	0	0
Providence	0	5	3	4	0	0	0	2
Connecticut:								
Bridgeport	0	4	1		0	0	0	4
Hartford	1	3	0		0	1	0	4
New Haven	2	1	1		0	1	0	2
MIDDLE ATLANTIC								
New York:								
Buffalo	1	13	9		0	0	4	12
New York	17	109	30	3	2	17	18	72
Rochester	2	3	0		0	0	0	3
Syracuse	5	2	0		0	0	0	3
New Jersey:								
Camden	5	5	1		0	3	0	1
Newark	8	11	24	2	0	2	10	4
Trenton	3	2	0		0	0	0	2
Pennsylvania:								
Philadelphia	5	43	14	1	1	3	9	18
Pittsburgh	3	17	11		1	1	3	16
Reading	1	1	0		0	0	2	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	2	9	2		0	1	0	4
Cleveland	15	42	5	4	1	0	8	8
Columbus	6	4	6		0	0	1	0
Toledo	5	8	2		0	1	0	5
Indiana:								
Fort Wayne	3	3	0		0	0	0	1
Indianapolis	1	13	2		0	0	0	10
South Bend	0	1	0		0	0	0	1
Terre Haute	0	1	0		0	0	0	2
Illinois:								
Chicago	15	74	87	3	0	4	11	29
Springfield	0	1	0		0	0	0	0
Michigan:								
Detroit	17	53	26		1	1	9	20
Flint	3	3	0		0	1	1	1
Grand Rapids	0	2	0		0	0	1	2

City reports for week ended October 4, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—contd.								
Wisconsin:								
Kenosha	7	0	0	----------	0	0	0	0
Madison	4	1	0	----------	0	1	3	----------
Milwaukee	5	10	0	----------	0	0	5	5
Racine	2	1	0	----------	0	0	0	1
Superior	2	1	0	----------	0	1	0	2
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	1	0	----------	0	0	0	2
Minneapolis	8	26	2	----------	0	0	1	9
St. Paul	3	13	0	----------	0	0	0	3
Iowa:								
Des Moines	2	4	1	----------	----------	0	0	----------
Sioux City	0	2	2	----------	----------	1	4	----------
Waterloo	11	0	0	----------	----------	1	0	----------
Missouri:								
Kansas City	----------	7	----------	----------	----------	----------	----------	----------
St. Joseph	0	1	0	----------	0	0	0	1
St. Louis	1	30	13	1	----------	30	0	----------
North Dakota:								
Fargo	4	0	0	----------	0	0	6	0
Grand Forks	0	0	0	----------	----------	0	0	----------
South Dakota:								
Sioux Falls	0	0	0	----------	----------	0	0	----------
Nebraska:								
Omaha	0	11	9	----------	0	0	0	5
Kansas:								
Topeka	0	2	1	----------	0	1	0	0
Wichita	0	2	1	----------	0	0	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	1	----------	0	0	0	0
Maryland:								
Baltimore	18	19	3	----------	0	1	3	11
Cumberland	0	0	0	1	1	0	0	0
Frederick	0	0	0	----------	0	0	0	0
District of Columbia:								
Washigton	2	12	8	----------	0	3	0	6
Virginia:								
Lynchburg	0	3	1	----------	0	0	0	0
Norfolk	1	2	2	----------	0	1	1	2
Richmond	0	20	8	----------	0	2	0	0
Roanoke	0	6	0	----------	0	0	0	0
West Virginia:								
Charleston	1	1	3	----------	0	0	1	0
Wheeling	3	1	0	----------	0	0	0	0
North Carolina:								
Raleigh	0	4	1	----------	0	0	0	2
Wilmington	0	1	2	----------	0	0	0	0
Winston-Salem	1	4	0	----------	0	1	0	1
South Carolina:								
Charleston	0	1	1	6	0	0	0	1
Columbia	0	1	0	----------	0	0	0	4
Georgia:								
Atlanta	0	8	2	13	0	0	1	0
Brunswick	0	0	0	----------	0	0	0	0
Savannah	0	2	4	4	0	3	2	1
Florida:								
Miami	0	2	0	----------	0	0	0	2
St. Petersburg	----------	0	----------	----------	0	----------	----------	0
Tampa	0	1	0	----------	0	1	0	0

City reports for week ended October 4, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	0		0	0	0	0
Tennessee:								
Memphis	0	6	9		0	0	4	2
Nashville	0	3	3		1	0	0	5
Alabama:								
Birmingham	1	5	4		1	0	0	7
Mobile	0	1	1		0	0	0	2
Montgomery	0	3	0	4		0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	1	1			0	0	
Little Rock	2	1	0		0	1	0	6
Louisiana:								
New Orleans	0	9	9	2	2	0	0	8
Shreveport	0	1	3		0	0	0	0
Oklahoma:								
Tulsa	1	4	2			1	0	
Texas:								
Dallas	0	14	8		0	0	3	0
Fort Worth	0	3	1		0	0	0	2
Galveston	0	0	0		0	0	0	1
Houston	0	6	7		0	1	0	4
San Antonio	0	2	2		1	0	0	1
MOUNTAIN								
Montana:								
Billings	0	0	0		0	0	0	2
Great Falls		0						
Helena	0	0	0		0	0	0	0
Missoula	4	0	0		0	0	0	2
Idaho:								
Boise	0	0	0		0	0	0	2
Colorado:								
Denver	8	10	1		1	0	2	7
Pueblo	0	2	0		0	7	1	0
New Mexico:								
Albuquerque	0	0	0	1	0	0	0	2
Utah:								
Salt Lake City	3	3	0		1	1	3	2
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	13	4	8			3	16	
Spokane		3						
Tacoma	0	3	2		0	0	0	1
Oregon:								
Portland	5	7	1	1	0	3	1	3
Salem	1	0	0		0	1	1	0
California:								
Los Angeles	8	29	11	16	0	5	10	11
Sacramento	1	2	0	1	1	2	2	2
San Francisco	17	14	4	1	0	1	7	2

City reports for week ended October 4, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
NEW ENGLAND											
Maine:											
Portland	1	4	0	0	0	0	0	1	0	14	13
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	11
Nashua	0	0	0	0	0	0	0	0	0	0	
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	3
Burlington	0	0	0	0	0	0	0	0	0	0	8
Massachusetts:											
Boston	26	10	0	0	0	10	3	1	1	21	174
Fall River	2	3	0	0	0	1	1	0	1	1	17
Springfield	3	0	0	0	0	2	0	0	0	0	28
Worcester	6	11	0	0	0	1	0	0	0	1	43
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	13
Providence	3	1	0	0	0	1	1	0	0	9	65
Connecticut:											
Bridgeport	3	1	0	0	0	0	0	3	0	0	22
Hartford	2	1	0	0	0	4	0	0	0	5	40
New Haven	2	2	0	0	0	2	1	0	0	5	37
MIDDLE ATLANTIC											
New York:											
Buffalo	10	9	0	0	0	6	2	3	1	24	112
New York	47	31	0	0	0	90	30	15	2	107	1,120
Rochester	2	9	1	0	0	1	1	1	0	3	54
Syracuse	3	3	0	0	0	1	1	0	0	12	41
New Jersey:											
Camden	0	2	0	0	0	0	0	0	0	1	24
Newark	5	4	0	0	0	5	2	1	0	31	93
Trenton	1	7	0	0	0	1	0	1	0	2	35
Pennsylvania:											
Philadelphia	32	22	0	0	0	18	11	7	1	16	397
Pittsburgh	24	14	0	0	0	6	2	3	0	12	137
Reading	1	1	0	0	0	0	0	0	0	0	20
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	8	22	1	0	0	7	2	1	0	4	116
Cleveland	19	16	0	0	0	12	2	1	0	23	163
Columbus	6	4	0	1	0	4	1	1	0	1	62
Toledo	7	4	0	0	0	3	1	2	0	0	71
Indiana:											
Fort Wayne	0	0	0	0	0	0	0	0	0	0	16
Indianapolis	7	6	0	0	0	4	2	0	0	8	
South Bend	2	1	0	0	0	1	0	0	0	0	21
Terre Haute	1	2	0	0	0	1	0	0	1	0	20
Illinois:											
Chicago	52	48	0	0	0	45	6	6	0	44	581
Springfield	1	0	0	0	0	0	1	0	0	0	24
Michigan:											
Detroit	42	30	0	1	0	24	4	2	1	39	284
Flint	8	11	0	0	0	1	0	1	0	2	25
Grand Rapids	5	7	0	0	0	1	1	1	0	1	20
Wisconsin:											
Kenosha	1	9	0	0	0	0	1	0	0	0	4
Madison	1	5	0	0			0	0		1	
Milwaukee	15	5	1	0	0	4	1	1	0	13	98
Racine	3	8	0	0	0	1	0	0	0	7	11
Superior	2	2	0	0	0	1	1	0	0	0	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth	5	0	0	0	0	1	0	0	0	7	21
Minneapolis	30	4	1	0	0	2	1	0	0	2	85
St. Paul	14	6	1	0	0	3	1	0	0	2	55
Iowa:											
Des Moines	4	2	1	0			0	0		1	31
Sioux City	1	1	0	0			0	0		3	1
Waterloo	1	1	0	0			0	0		0	

City reports for week ended October 4, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—contd.											
Missouri:											
Kansas City	9		0				3				
St. Joseph	3	2	0	0	0	1	0	0	0	0	29
St. Louis	19	9	0	0	0	10	3	6	0	4	156
North Dakota:											
Fargo	2	3	0	0	0	1	0	0	0	3	6
Grand Forks	0	0	0	0			0	0		0	
South Dakota:											
Sioux Falls	1	1	0	6			0	0		0	7
Nebraska:											
Omaha	3	6	0	0	0	1	0	0	0	0	66
Kansas:											
Topeka	3	0	0	0	0	1	0	0	0	0	18
Wichita	3	1	0	0	0	0	1	0	0	0	22
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	0	0	0	0	0	0	0	0	0	24
Maryland:											
Baltimore	10	11	0	0	0	13	8	4	1	18	167
Cumberland	0	1	0	0	0	0	0	1	0	0	13
Frederick	1	0	0	0	0	0	0	0	0	0	1
District of Columbia:											
Washington	10	4	0	0	0	9	3	4	0	1	113
Virginia:											
Lynchburg	1	0	0	0	0	0	1	1	0	0	6
Norfolk	1	3	0	0	0	0	0	0	0	0	
Richmond	7	3	0	0	0	0	0	1	0	2	34
Roanoke	3	0	0	1	0	0	1	0	0	0	20
West Virginia:											
Charleston	2	3	0	0	0	0	1	1	1	0	30
Wheeling	2	0	0	0	0	1	1	0	0	0	14
North Carolina:											
Raleigh	2	0	0	0	0	1	0	0	0	3	7
Wilmington	0	2	0	0	0	0	0	0	0	0	8
Winston-Salem	3	3	0	0	0	1	1	2	1	0	
South Carolina:											
Charleston	1	1	0	0	0	1	2	1	0	0	17
Columbia	1	1	0	0	0	3	1	0	1	0	29
Georgia:											
Atlanta	7	8	1	0	0	4	1	4	3	2	61
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	0	0	0	0	0	1	1	2	0	0	21
Florida:											
Miami	0	1	0	0	0	2	0	0	0	0	18
St. Petersburg	0		0		0	0	0		0		6
Tampa	0	1	0	0	0	2	0	0	0	0	18
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	4	0	0	0	3	0	0	0	0	19
Tennessee:											
Memphis	4	1	1	0	0	6	3	3	0	9	50
Nashville	2	1	0	0	0	2	2	2	0	2	47
Alabama:											
Birmingham	6	4	0	0	0	5	2	5	0	1	61
Mobile	1	1	0	0	0	1	0	0	0	0	19
Montgomery	1	0	0	0			0	0		9	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	3	0	0			0	0		0	
Little Rock	1	0	0	0	0	1	0	1	0	0	
Louisiana:											
New Orleans	3	2	0	1	0	9	4	11	1	6	134
Shreveport	1	0	0	0	0	1	1	0	0	0	19

City reports for week ended October 4, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL—continued											
Oklahoma:											
Tulsa	3	4	0	0			1	0		0	
Texas:											
Dallas	4	3	0	0	0	0	1	2	1	1	37
Fort Worth	1	0	0	0	0	1	0	0	0	0	31
Galveston	0	0	0	0	0	1	1	0	0	0	15
Houston	1	1	0	0	0	4	1	0	0	0	67
San Antonio	1	1	0	0	0	3	1	1	0	0	39
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	9	7
Great Falls	1		0				1				
Helena	0	0	0	0	0	0	0	0	0	0	7
Missoula	0	0	0	0	0	0	0	1	0	0	7
Idaho:											
Boise	0	0	0	0	0	0	0	1	0	0	2
Colorado:											
Denver	7	8	0	0	0	6	2	3	1	14	78
Pueblo	0	0	0	0	0	1	2	1	0	2	10
New Mexico:											
Albuquerque	1	0	0	0	0	5	1	0	0	0	13
Utah:											
Salt Lake City	3	5	1	0	0	2	3	7	1	13	21
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	5
PACIFIC											
Washington:											
Seattle	6	10	0	0			2	4		12	
Spokane	5		0				0				
Tacoma	2	2	1	0	0	2	1	0	0	0	21
Oregon:											
Portland	5	1	2	0	0	2	1	0	0	0	58
Salem	0	0	0	0	0	0	2	0	0	0	
California:											
Los Angeles	14	15	0	0	0	12	2	4	0	17	194
Sacramento	2	3	0	1	0	4	1	0	0	5	17
San Francisco	9	6	0	0	0	13	1	0	0	12	148

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	12	0
Massachusetts:									
Boston	0	1	0	0	0	0	3	31	1
Fall River	1	0	0	0	0	0	0	0	0
Springfield	0	0	0	0	0	0	1	1	0
Worcester	1	0	0	0	1	1	1	1	0
Rhode Island:									
Providence	1	0	0	0	0	0	1	1	0
Connecticut:									
Hartford	0	0	0	0	0	0	0	0	1

City reports for week ended October 4, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
MIDDLE ATLANTIC									
New York:									
Buffalo	1	0	0	0	0	1	1	3	0
New York [1]	2	0	1	2	0	0	19	0	1
Rochester	1	0	0	0	0	0	1	1	1
Syracuse	0	0	0	0	0	0	1	11	1
Pennsylvania:									
Philadelphia	1	1	1	1	0	0	1	1	0
Pittsburgh	1	0	0	1	0	0	0	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	1	0	0	0	0	1	5	1
Cleveland	2	1	0	0	0	1	1	26	0
Columbus	0	0	0	0	0	0	0	1	0
Toledo	0	0	1	0	0	0	1	0	1
Indiana:									
Indianapolis	0	0	0	0	0	0	0	1	0
South Bend	1	0	0	0	0	0	0	1	1
Terre Haute	0	0	0	0	0	0	0	2	0
Illinois:									
Chicago	3	2	0	0	0	0	4	8	3
Springfield	0	0	0	0	0	0	0	1	0
Michigan:									
Detroit	2	1	2	1	0	0	4	4	1
Flint	0	1	0	0	0	1	0	0	0
Grand Rapids	0	0	0	0	0	0	0	2	0
Wisconsin:									
Kenosha	0	0	0	0	0	0	0	2	0
Madison	0	0	0	0	0	0	0	1	0
Milwaukee	2	2	0	0	0	0	0	6	2
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	3	0	0	0	0	0	0	2	0
Iowa:									
Des Moines	1	0	0	0	0	0	0	5	0
Sioux City	0	0	0	0	0	0	0	1	1
Waterloo	0	0	0	0	0	0	0	1	0
Missouri:									
St. Joseph	0	0	0	1	0	0	0	2	0
St. Louis	2	1	0	0	0	0	1	1	1
North Dakota:									
Fargo	0	0	0	0	0	0	1	1	0
South Dakota:									
Sioux Falls	0	0	0	0	0	0	0	1	0
Nebraska:									
Omaha	1	0	0	0	0	0	1	3	0
Kansas:									
Topeka	0	0	0	0	0	0	1	2	0
Wichita	1	1	0	0	0	0	0	2	0
SOUTH ATLANTIC [1]									
Maryland:									
Baltimore [1]	0	0	0	0	0	0	1	1	0
Virginia:									
Norfolk	0	0	0	0	0	0	0	1	0
North Carolina:									
Raleigh	0	0	0	0	0	1	0	0	0
Winston-Salem	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston [2]	1	0	0	0	1	0	0	0	0
Columbia	0	0	0	0	0	1	0	0	0
Florida: [1]									
Miami	0	0	0	0	1	0	0	0	0

[1] Typhus fever, 11 cases: 1 case at New York City, N. Y.; 1 case at Baltimore, Md.; 8 cases at Savannah, Ga.; and 1 case at Tampa, Fla.
[2] Dengue, 2 cases at Charleston, S. C.

City reports for week ended October 4, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Kentucky:									
Covington	0	0	0	0	0	0	0	1	0
Tennessee:									
Memphis	2	1	0	0	0	0	0	3	0
Alabama:									
Birmingham	0	0	0	0	1	0	0	0	0
Mobile	0	0	0	0	1	1	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	3	0	1	0
Louisiana:									
Shreveport	0	0	0	0	0	1	0	0	0
Oklahoma:									
Tulsa	0	0	0	0	0	0	0	2	0
Texas:									
Dallas	0	0	0	0	1	1	0	1	0
Houston	0	0	0	0	0	0	0	1	0
MOUNTAIN									
Montana:									
Billings	0	1	0	0	0	0	0	0	0
Colorado:									
Denver	0	0	0	0	0	0	0	1	1
New Mexico:									
Albuquerque	0	0	0	0	1	0	0	1	1
Utah:									
Salt Lake	3	0	0	0	0	0	0	0	0
PACIFIC									
Oregon:									
Portland	0	0	0	0	0	0	1	2	0
California:									
Los Angeles	0	0	0	0	2	0	0	11	0
San Francisco	0	0	1	1	1	0	0	21	4

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended October 4, 1930, compared with those for a like period ended October 5, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, August 31 to October 4, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended— Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929
98 cities	41	[2] 64	45	66	47	75	58	83	[3] 62	97
New England	35	[2] 46	55	47	31	49	51	76	49	88
Middle Atlantic	31	45	28	41	38	54	33	60	43	62
East North Central	49	86	64	95	75	96	75	90	80	124
West North Central	34	38	55	58	47	64	57	100	[4] 62	108
South Atlantic	60	92	62	133	42	114	92	112	62	129
East South Central	54	75	27	116	27	137	34	137	115	157
West South Central	60	133	49	61	67	149	146	164	112	198
Mountain	43	70	34	26	26	70	60	26	[5] 9	26
Pacific	38	34	26	22	14	19	31	65	[6] 62	56

MEASLES CASE RATES

	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929
98 cities	24	[2] 12	16	16	16	15	18	13	[3] 19	16
New England	33	[2] 21	38	16	18	31	42	18	33	34
Middle Atlantic	28	7	20	12	17	7	13	10	12	12
East North Central	13	16	9	20	14	17	13	13	5	12
West North Central	30	2	15	6	19	6	28	10	[4] 73	10
South Atlantic	26	2	5	7	20	7	9	13	20	11
East South Central	27	14	7	7	0	7	74	0	0	0
West South Central	0	4	4	11	0	8	11	11	7	0
Mountain	51	26	34	61	43	26	26	44	[5] 73	35
Pacific	40	46	19	39	21	51	19	24	[6] 27	65

SCARLET FEVER CASE RATES

	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929
98 cities	43	[2] 52	51	54	62	68	72	95	[3] 74	102
New England	55	[2] 83	51	52	71	49	80	99	73	135
Middle Atlantic	25	25	27	16	47	25	33	42	49	48
East North Central	47	70	85	90	91	121	118	161	107	149
West North Central	57	67	34	58	44	92	76	108	[4] 73	119
South Atlantic	66	64	51	47	40	66	57	105	• 70	120
East South Central	67	41	40	96	40	28	128	75	74	82
West South Central	67	34	26	91	56	72	56	72	37	72
Mountain	34	17	77	70	69	113	94	139	[5] 118	131
Pacific	33	77	73	72	78	68	87	84	[6] 89	12[illegible]

SMALLPOX CASE RATES

	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929
98 cities	3	[2] 4	3	3	5	5	3	4	[3] 1	7
New England	0	[2] 0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	3	10	2	4	9	10	3	3	1	7
West North Central	13	2	27	8	21	6	13	8	[4] 0	2
South Atlantic	4	0	0	2	0	0	0	0	2	0
East South Central	0	0	0	0	0	0	0	0	0	48
West South Central	0	0	0	0	0	0	4	0	4	0
Mountain	0	9	0	9	0	52	0	96	[5] 0	52
Pacific	14	14	9	12	5	17	19	10	[6] 2	36

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930 and 1929, respectively.
[2] Pawtucket, R. I., not included.
[3] Kansas City, Mo., Great Falls, Mont., and Spokane, Wash., not included.
[4] Kansas City, Mo., not included.
[5] Great Falls, Mont., not included.
[6] Spokane, Wash., not included.

Summary of weekly reports from cities, August 31 to October 4, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929
98 cities	21	[2] 18	27	21	22	22	18	20	[3] 20	16
New England	11	[2] 2	20	16	11	13	11	7	11	11
Middle Antlantic	22	20	25	18	16	14	14	12	15	14
East North Central	12	13	17	10	11	11	9	9	9	12
West North Central	13	12	21	17	28	6	15	23	[4] 13	15
South Atlantic	53	34	64	34	62	26	51	17	38	30
East South Central	54	55	51	89	54	0	20	82	67	21
West South Central	49	15	56	50	67	84	37	27	56	8
Mountain	9	44	60	70	0	340	43	313	[5] 118	113
Pacific	9	14	5	19	17	7	14	10	[6] 20	10

INFLUENZA DEATH RATES

	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929
91 cities	3	[2] 3	3	3	3	2	3	5	[7] 3	6
New England	0	[2] 2	0	0	2	2	2	2	0	4
Middle Atlantic	3	2	4	2	2	0	2	5	2	7
East North Central	2	6	3	2	3	2	2	4	1	5
West North Central	6	0	0	6	0	6	0	3	[4] 0	6
South Atlantic	7	4	2	2	0	2	4	6	2	7
East South Central	0	7	22	7	29	7	15	0	15	0
West South Central	11	0	0	12	8	0	4	12	11	16
Mountain	9	0	0	9	17	9	0	17	[5] 18	0
Pacific	0	3	0	0	0	9	6	3	3	9

PNEUMONIA DEATH RATES

	Sept. 6, 1930	Sept. 7, 1929	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929
91 cities	55	[2] 57	55	55	58	54	58	67	[7] 60	77
New England	51	[2] 41	62	36	51	29	35	72	40	36
Middle Atlantic	68	75	67	66	68	59	76	72	63	93
East North Central	36	44	43	47	43	47	48	54	54	61
West North Central	50	57	44	45	74	39	35	81	[4] 81	108
South Atlantic	62	61	53	52	51	66	51	60	48	81
East South Central	103	75	29	90	81	67	74	119	118	30
West South Central	54	31	61	55	50	51	77	91	77	113
Mountain	51	52	120	70	112	104	51	70	[5] 137	87
Pacific	31	31	31	41	49	57	49	38	49	47

[2] Pawtucket, R. I., not included.
[3] Kansas City, Mo., Great Falls, Mont., and Spokane, Wash., not included.
[4] Kansas City, Mo., not included.
[5] Great Falls, Mont., not included.
[6] Spokane, Wash., not included.
[7] Kansas City, Mo., and Great Falls, Mont., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended September 27, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended September 27, 1930, as follows:

Province	Cerebro-spinal fever	Dysentery	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]							
Nova Scotia					4		2
New Brunswick							13
Quebec	1						39
Ontario	1		9		53	1	47
Manitoba	1			2	4		7
Saskatchewan							6
Alberta					5		10
British Columbia	2	1			3	1	4
Total	5	1	9	2	69	2	137

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended October 4, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended October 4, 1930, as follows:

Disease	Cases	Disease	Cases
Chicken pox	16	Poliomyelitis	3
Diphtheria	39	Puerperal fever	1
Erysipelas	2	Scarlet fever	50
German measles	4	Smallpox	1
Influenza	1	Tuberculosis (pulmonary)	3
Measles	55	Tuberculosis (other forms)	39
Mumps	29	Typhoid fever	20
Paratyphoid fever	2	Whooping cough	30

CUBA

Habana—Communicable diseases—September, 1930.—During the month of September, 1930, cases of certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	4		Scarlet fever	4	
Diphtheria	13	1	Tuberculosis	54	29
Malaria [1]	9		Typhoid fever [1]	28	4
Measles	4				

[1] Many of these cases are from the island of Cuba outside of Habana.

Provinces—Communicable diseases—Four weeks ended September 27, 1930.—During the four weeks ended September 27, 1930, cases of certain communicable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		11	2	3	1	1	18
Chicken pox		5	1	1			7
Diphtheria	2	17	5	4	2	1	31
Malaria	10	9	1		7	29	56
Measles		3					3
Paratyphoid fever		1	1	2	1	4	9
Scarlet fever		4	1				5
Tetanus (infantile)				1			1
Typhoid fever	8	51	11	35	5	14	124

JAMAICA

Communicable diseases—Four weeks ended September 13, 1930.—During the four weeks ended September 13, 1930, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica, outside of Kingston, as follows:

Disease	Cases		Disease	Cases	
	Kingston	Other localities		Kingston	Other localities
Cerebrospinal meningitis	1	3	Lethargic encephalitis		1
Chicken pox	1	23	Puerperal septicemia		3
Dysentery	1	16	Tuberculosis	42	81
Leprosy	2	3	Typhoid fever	13	78

MEXICO

Tampico—Communicable diseases—September, 1930.—During the month of September, 1930, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Enteritis (various)		36	Tuberculosis	69	19
Influenza	1		Typhoid fever	1	2
Malaria	140	13	Whooping cough	13	
Measles	2				

PANAMA CANAL ZONE

Communicable diseases—July–August, 1930.—During the months of July and August, 1930, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	July, 1930		August, 1930	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	1	1	1	1
Chicken pox	27	1	10	
Diphtheria	27		35	
Dysentery (amebic)	2	1	7	
Dysentery (bacillary)			6	
Leprosy		1		
Malaria	464	7	171	4
Measles	16		11	
Mumps	4			
Pneumonia		30		26
Scarlet fever	1			
Tuberculosis		25		14
Typhoid fever	2		3	2
Whooping cough	12		17	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11
Afghanistan	C					P[1]						P							
China:																			
Canton	C		3	2		2	1												
	D					1													
Shanghai	C												8	4		22	23		
	D													1	1	1	2		
Swatow	C		3	7					1										
Tientsin	C											2	1	1					
India	C	41,462	56,311	57,102	6,728	5,520	5,701	8,172	7,199	11,597	11,993	12,104							
	D	27,966	44,878	25,711	3,712	3,095	3,133	3,882	3,676	6,033	6,345	6,304							
Bassein	C	7	7											1					
	D	5	5																
Bombay	C								3	2	3	6					1		
	D								2	1	1	4							
Calcutta	C	617	669	327	81	53	49	37	18	10	17	18	8	10		9	4		
	D	414	372	179	54	28	23	23	7	7	10	6	3	3		6	3		
Negapatam	C			1															
	D			1															
Rangoon	C	1	9	6	1				1				1	1					
	D	1	3	4	1				1				1						
India (French):																			
Chandernagor	C	6	6	3			1							1					
	D	5	6	2															
Karikal	C	1		3															
	D	1		3															
India: Portuguese	C										1								
Indo-China (see also table below):																			
Pnompenh	C	2	1	40	9	16	7		3	3	3						1		
	D		5	18	6	9	5	2	3	2	1								
Saigon and Cholon	C	76	160	48	7	1	1	1	2	2	1						1		
	D	55	101	23	3					1									

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11
Philippine Islands:[1]																			
Ports—																			
Cebu	C			1	20	13	13	9	5	4			1	1					
	D				9	7	12	8	4	4			1	1					
Iloilo	C					1	11	17	9	19	32	4	3	4	1	2	1		
	D						9	13	10	18	19	9	4	5	2	3	2		
Manila	C		1							1			16	13	5	4	2	1	2
	D												5	6	1			1	
Provinces—																			
Antique	C								14	3		3	2	21	12	8	12		
	D								7	3		2	1	10	12	7	8		
Bohol	C									54	54	30	30	26	4	1			
	D									29	32	18	12	11	2				
Bulacan	C			3		1	1	2	1				1	1	1			2	
	D			1									1					1	
Capiz	C						2	1	1	1			1						
	D						1	1	1	1									
Cebu	C		1	355	313	222	115	63	55	26	4		1	16	8				
	D		1	170	131	83	60	29	32	15	3		1	6	4				
Iloilo	C			2	20	45	85	159	143	209	127	92	71	57	66	46	18	7	13
	D			1	10	23	64	96	77	143	91	65	45	44	37	26	15	6	7
La Union	C					1													
Leyte	C			47	11														
	D			19	11														
Masbate	C			10	14	32	25	21	15	19									
	D			3	2	18	5	10	5	9									
Misamis, Occidental	C				1	2													
	D				1	2													
Negros, Occidental	C		10	140	62	163	172	171	151	79	45	68	40	47	21	15	8	10	5
	D		7	88	42	90	122	114	97	64	33	43	32	32	18	9	6	5	6
Negros, Oriental	C				1	1	6	15	6	2									
	D					1	3	9	1	3									
Nueva Acija	C							1											
	D							1											
Pampanga	C			2	2								1						

Pangasinan	C				[illegible]		1		1										
	D				2				1										
Rizal	C			1		1													
	D			1		1													
Samar	C									5	3	10			2	1	4		
	D									5	3	8			2		4		
Surigao	C									15	2	11	1				(3)		
	D									9	2	6	2						
Tarlac	C								1										
Siam	C	29	33	27	8	3	8	1		1	1	1							
	D	13	21	19	4	1	3	1		1		1							
Bangkok	C	15	9	12		3	4	1	1		1								
	D	4	3	5		1	1	1	1		1								
Nagara Pathom	C	10																	
	D	2																	
Songkla	C					8		2											
	D					4		2											
On vessel:																			
S. S. Malwa from Shanghai	D															1			
S. S. Sassari at Massoua, from Jeddah	C		1																
	D		1																
On small boat at Port Cebu, from Bantayan Island	C			1															
	D			1															

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930			July, 1930			August, 1930			Sept. 1-10, 1930
						1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	
Indo-China (French) (see also table above):															
Annam [4]	C	4	52	60	23	2	14				1		3		
Cambodia [4]	C	90	81	24	88	56	88				43	37	22		23
Cochin-China [4]	C	65	82	48	671	147	126				46	22	5		9

[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] During the period from August 24 to September 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, Philippine Islands.
[4] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930				August, 1930					September, 1930				October, 1930	
					5	12	19	26	2	9	16	23	30	6	13	20	27	4	11
Algeria:																			
Algiers	C					1	2			1		6	1	2	6	2	1	1	
Constantine	C			1	1														
Oran	C						2	1	1	1	1	1	1	2	3	4			
Philippeville	C													1			1		
Azores: Ponta Delgada	C	8																	
	D	5																	
Belgian Congo	C				2				1		1		2	3					
	D				2				1		1			3					
British East Africa (see also table below):																			
Tanganyika	C	44																	
	D	20																	
Uganda	C	117	227	406		50	100	78	52	67									
	D	105	195	328		47	97	69	50	64									
Canary Islands: Las Palmas	D								1										
Ceylon:																			
Colombo	C	1	6	1	1	2					1	1	2				1		
	D	1	5	1	1	2					1	1	3				1		
Plague-infected rats		4		1															
Chile: Antofagasta	C	1																	
	D	1																	
China: Manchuria—Tungliau and Nungan	C											30			29	P	2		
Dutch East Indies:																			
Batavia and West Java	C	87	82	98	19	25	18	22	19	30	20	14	13						
	D	81	82	98	19	25	18	22	19	30	20	14	12						
Plague-infected rats		8	5	4						1				1	1				
Java and Madura	D	173	185	202	55	56	58	48	45	51	47	45	55						
Ecuador (see table below).																			
Egypt:																			
Alexandria	C	2	13	19	8	8	3	4	2	2	4	3	3	3	2	2	2	1	
	D	2	3	9	2	3	2	3	2	1	3		5	1	2		3	1	
Assiout	C	14	20	9	1	1													
	D	5	5	3	1	1													
Beni-Suef	C											1							

Dakahlieh	C	5	11	1															
	D		2																
Gharbieh	C	1							3										
	D	1							1										
Girga	C	1				1							1						
Minieh	C		7	10	2	1													
	D		1	1															
Port Said	C	1	2	2				1	1										
France:																			
Marseille	C												2	2	1				4
St. Ouen	C						1												
	D						1												
Gambia	C											4							
	D											4							
Greece (see also table below):																			
Patras	C			1			1												
Pyrgos	C																	2	
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats				1															
India	C	2,215	648	240	70	75	87	145	145	189	293	250							
	D	1,960	635	187	46	46	62	102	98	84	154	141							
Bassein	C												1		1				
	D												1		2				
Bombay	C	4	6	3				1						1			1		
	D	8	5	2				1						1					
Plague-infected rats		108	81	23	13	14	10	15	10	8	9	9	12	9	11	15	21		
Madras Presidency	C	44	38	39	10	1	10	26	35	21	7	18		47					
	D	19	11	22	4	1	9	17	13	9	1	11		23					
Rangoon	C	5	4	1				2	2	1			2	1	5	2	2		
	D	4	3	1				2	1	1			2	1	4	2	2		
Plague-infected rats		4	5	1	2	2		2	4		2	1	2		2	4			
India (Portuguese)	D		7								P								
Indo-China (see also table below):																			
Pnompenh	C	3	3	6		1	1			2		2	2	1			1		
	D	4	1	7		1	1												
Saigon and Cholon	C		1	2							1			1			1		
	D			1															
Iraq: Baghdad	C	6	37	28	10	4	2	2	4	3	2							1	
	D	2	18	15	5		1	1		2	1							1	
Japan: Osaka (vicinity of)—Plague-infected rats		3																	
Kwang-Chow-Wan	C	37	34	31				4			1								
Madagascar (see also table below): Tamatave	C	1		1				1	2					1	P				
Morocco	C	121	71	3				1		8	7								
	D	45	34	4						1	1								
Nigeria: Lagos	C		2	5	1				2	1	3	1	1	1		1			
	D		2	5	1				2	1	3	1	1	1		1			
Plague-infected rats		7	17	11	2	3	6	7			4	4		4					
Senegal (see table below).																			
Siam	C	5	5						2	3		2	3						
	D	6	4						1	3		2	2						
Bangkok	C		5						1	2									
	D		4							2									

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930				August, 1930					September, 1930				October, 1930	
					5	12	19	26	2	9	16	23	30	6	13	20	27	4	11
Siam—Continued.																			
Nagara Pathom	C	10																	
	D	9																	
Nagara Rajsima	C	1							1			1		1					
	D	1							1			1		1					
Syria: Beirut	C			12		2	4	3		1		1	3	2					
Tripolitania	C										2								
Tunisia:																			
Sfax district	C	1	21	9				6		1									
Tunis	C	4	1	1		1	4												
	D			1		1													
Union of Socialist Soviet Republics:																			
Salsk Region	C			2			3	2	4		3								
	D			1			2	2	3		2								
Stavropol Region	C			1															
	D			1															
Union of South Africa:																			
Cape Province	C		P	1			1					1							
	D						1				1								
Orange Free State	C	1											1						
	D												1						

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
British East Africa (see also table above):							
Kenya	C	85	16	171	107	97	27
Ecuador: Guayaquil	C	2	0	0	0	...	...
	D	0	0	0	0	...	...
Plague-infected rats		2	0	0	0	...	...
Greece (see also table above)	C	...	1	...	1	...	...
Indo-China (see also table above)	C	27	4	...	11	1	2
Madagascar (see also table above):							
Ambositra Province	C	25	14	1	...	...	...
	D	20	12	1	...	...	...
Antisirabe Province	C	38	46	19	3	8	...
	D	36	45	19	3	8	...
Itasy Province	C	4	...	...	...	...	...
	D	4	...	...	...	...	...
Miarinarivo Province	C	14	1	5	1	1	...
	D	14	1	5	1	1	...
Madagascar (see also table above)—Con.							
Moramanga Province	C	5	3	1	3	...	...
	D	5	3	...	3	...	...
Tananarive Province	C	52	39	15	16	11	...
	D	52	38	14	16	11	...
Senegal:							
Baol [1]	C	18	24	13	2	62	79
	D	8	12	11	2	48	20
Dakar [1]	C	...	2	52	53	140	108
	D	...	2	42	117	122	90
Louga [1]	C	...	33	54	60	138	75
	D	...	10	27	21	103	33
Thies [1]	C	3	12	21	52	54	34
	D	2	9	8	35	30	20
Tivaouane [1]	C	11	71	135	43	119	110
	D	8	38	69	28	70	54

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27
Algeria:																		
Algiers	C	5	1	3			1				1		2					
Constantine	C				1			1										
Oran	C	1																
Arabia: Aden	C	3	1			1												
Bolivia: La Paz.[1]																		
British East Africa (see also table below):																		
Tanganyika	C	103	57	409	1,610	64	4		100	26	51	44	121					
	D	7	14	70	301	13	2		27	4		3	30					
British South Africa:																		
Northern Rhodesia	C	9	1	53														
	D		2	9														
Southern Rhodesia	C		66	155	79	1	12	18					1	1				
	D		1	13														
Canada:																		
Alberta	C	10	4				2	1	2	1							1	
Edmonton	C	4	3															
British Columbia—Vancouver	C	20	17	4	2	2	2	1	1	1	1		2			1	1	
Manitoba	C	4	4	10	4									1				
Ontario	C	100	77	82	47	3	5	6	10	8	3	5	4	2	2	6		1
North Bay	C			1														
Ottawa	C	19	21	25	15	1	1	4	7	5	1	1		2	1	2		
Toronto	C			4	4		1									1		
Quebec	C				4	3					2	2	1					
Montreal	C									7								
Saskatchewan	C	47	41	39	22		2		3				8			1		
Regina	C			4														
Ceylon: Angoda, Western Province	C		6															
	D		2															
China:																		
Canton	C	6	3															
	D	2	3															
Chungking	C		P	P	1	P	P	P	P	P		P	P	P				
Foochow	C		P	P	P		P		P		P		P					

Hong Kong	C	38	18	12	4		2											
	D	25	23	9	3		1											
Manchuria—																		
Harbin	C		1	20	4				3			2						
Kwantung—Dairen	C		2	8	16	8												
	D			4	1													
Nanking	C	P	P	P	P		P	P	P	P	P	P	P					
Shanghai—																		
Foreigners only	C	2	3	2	5	1	1	1	1	3						18		
Including natives	D	10	10	5	3											2		
Swatow	D	6	3	6	4	1				1		2	1	1	1			
Tientsin	C	2	2	1														
Chosen (see table below).																		
Colombia:																		
Barranquilla	C	2	1							2								
Buenaventura	C		15	4	6	4	3	2	1		1	1						
Costa Rica:																		
Port Limon	C		6	2	2													
San Jose [2]	C	10	7	2														
Curacao (alastrim)	C	14	2	2	1	2						1						
Dutch East Indies:																		
Borneo	C	185	90	16	12		2											
	D	12	31	1	1													
Java—																		
Batavia and West Java	C	78	64	12	13	3	1	3	1	1	4	5	2	2		2	1	
	D	6	11	7	3	2	1	1	1	1	1	1	2	2		1		
East Java and Madura	C		4					1										
Sanggi Islands	C	5	160	26				11		36								
	D	1	24	5				3		2								
Sumatra	C	48																
	D	5																
Egypt: Port Said	C		1	1			2		1									
France (see table below).																		
Great Britain:																		
England and Wales	C	1,700	1,427	1,417	926	156	138	126	109	70	86	95	93	99	106	75	61	82
Ashton under Lyne	C	15	18	17	7		4	2	2					1				
Bradford	C		3	2		1												
Cardiff	C	2	3			2												
Leeds	C	16	2			1												
London	C	710	602	637	498	84	52	62	48	36	50	41	51	43	44	36	41	30
London and Great Towns	C	1,239	1,066	1,078	753	127	95	102	83	61	73	71	80	79	84	51	54	55
	D	3	3															
Sheffield	C	8	2															
Stoke-on-Trent	C	122	85	62	32	3	2	1	3	1	1					1	1	
Scotland	C				4		1								5			
	D						1											
Honduras: Naco	C															5		

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica, outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27
India	C	39, 329	34, 843	22, 835	12, 962	2, 258	2, 006	1, 853	1, 513	11, 313	1, 282	1, 236	1, 046					
	D	9, 109	6, 983	5, 451	3, 531	733	580	577	458	368	327	290	261					
Bombay	C	718	430	218	113	17	15	11	7	6	2	2	2	2	1	1		
	D	431	270	161	79	13	9	9	2	5	2	1	2	2	1	2		
Calcutta	C	361	495	302	161	27	19	13	14	4		12	9	4	5	3	2	3
	D	305	403	258	146	17	17	12	10	4		8	9	3	4	1	1	3
Cochin	C	291	183	37	16			4	2	2	4	4	4	1	1		1	
	D	35	13	8	4									1				
Karachi	C	33	30	14	7				1	2		2				1	3	
	D	47	17	4	3					2		1					2	
Madras	C	173	133	72	35	6	10	17	16	19		9	10	9	11	6	8	4
	D	36	27	15	10	4	1	3	4	3		5	3	1	1	1	3	1
Moulmein	C	146	43	89	21	4	10	3	1				2	1				
	D	41	7	21	7	3	4	1	2				1			1		
Negapatam	C			1	2			1		2		2		1	2		6	4
Rangoon	C	10	4	6	9	2	1	1		1	1	1						
	D	5		1	2													
Tuticorin	C			5	1													
Vizagapatam	C	69	6	5	1													
	D	18	2	3														
India (French):																		
Chandernagor	C	6	10	24	19	3	1	4										
	D	2	2	7	3	1	1	1								1		
Karikal	C	24	19	12	11	1		1			8		1		5			1
	D	7	8	3	8	1		1			8		1		2			1
Pondicherry Province	C	21	24	40	23	4	9	8	5	7	8		7	11	7	1		11
	D	13	20	36	23	3	9	8	5	7	8		7	11	7	1		11
India (Portuguese)	C	38	44	47	28	1				1	6	1	1	1				
	D	2	8	8	10				1	1			1					
Indo-China (see also table below):																		
Pnompenh	C			3				1										
	D		2		1			1				1						
Saigon and Cholon	C	3	5	3	1						1			1				
	D	1	5	2						1	1	1		1				

Iraq:																		
Baghdad	C		8	1	1	1	1	1				1						
	D		1	1				1				1						
Basra	C		1															
Mossoul Liwa	C		22	21	4	47	20											63
	D		3	3	1	19	1											27
Ivory Coast (see table below).																		
Jamaica (alastrim)	C			2														
Japan: Tokyo	C		1															
	D		1															
Macao	D	3	2	1														
Mexico (see also table below):																		
Jalisco (State) Guadalajara	D	22	20	7	15	3	1				1							
Juarez	C	2			6						2							
	D				1						1							1
Mexico City and surrounding territory	C	106	99	80	77	10	12	4	11	2	3	3	2	7	2	1	2	
	D	31	47	32	17	2	3	1	2	1	3	2		1	1	1	2	
Progreso	C			1														
	D			1	1													
Morocco (see table below).																		
Nigeria: Lagos	C	1	1		1													
Poland	C		7	3	2													
Portugal:																		
Lisbon	C	7	8	8	10		7		6		6	19	25	7	8		12	4
Oporto	C												1					
Rumania	C	2																
Siam	C		8	2		2		4										
	D		4					3										
Somaliland, British: Boales	C	2																
	D	6																
Spain	C				12		1	1	3	2					4	1		
Straits Settlements	C	5	5	11	9	1	2	7	1	1	1	1	5	1	2	2	1	1
	D	1	2	3	2	1	1	1				1	1		1			
Sudan (Anglo-Egyptian)	C	60	42	19	67	8	1		3				42	102	5	20	1	25
	D	5	4	2	3		1						3	50	2			2
Sudan (French) (see table below).																		
Switzerland: Berne Canton	C								1	1	1							
Syria (see table below).																		
Taiwan: Taihoku (see table below).																		
Tunisia: Tunis	C	3	4	2	2				1								2	
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P					P									
Orange Free State	C	P						P	P	P								
Transvaal	C	P									P	P	P	P				
Upper Volta	C	2	3	1	13													
Zanzibar	C	13																
On vessel:																		
S. S. Elysia, at Port Sudan, from Bombay	C		1															
S. S. Naldera, at Port Said	C			1														
S. S. Manoa, from Honolulu to San Francisco	C					1												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930			July, 1930			August, 1930			Sept. 1-10, 1930
						1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	
Indo-China (see also table above)	C	434	26	261	305	80	133				233	59	34		54
Ivory Coast	C		7												
Sudan (French)	C	213	609	521	274	76				34				39	
	D	11	49	36	32	18								3	
Syria: Beirut	C	18	17	19	7	6	1				2	1			
Taiwan: Taihoku	C	43	58	12											

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
British East Africa (see also table above):							
Kenya	C	12	175	174	171	142	186
Uganda	C	109			78		
	D	99			69		
Chosen	C	263	236	253	107		3
	D	71	53	53	35		
Seishin	C	4		5	2	1	2
	D	1		1	1		
France	C	23	8	58	51		
Mexico: Durango (see also table above)	D	6	5	4	4	3	3
Morocco	C	74	17	10	18	5	3
Turkey	C	114		3	16		
	D	42					

TYPHUS FEVER

C indicates cases; D, deaths; P, presen

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30	September, 1930: 6	Sept. 13	Sept. 20	Sept. 27	Oct. 4, 1930
Algeria:																			
Algiers	C	6	8	15	3		1	2	3				2		3				
Constantine Department	C	11	15	6	12		1	1					3						
Oran	C			3	4		2	1			1			1					
Arabia: Aden	C	1																	
	D	1																	
Bolivia: La Paz.[1]																			
Brazil: Porto Alegre	C			1															
Bulgaria	C	9	15	6	16		4	5	1		1				2	2			
	D		1	2	1			1											
China:																			
Manchuria—Harbin (see also table below)	C	4	52	13	8	2				2				2					
Shanghai	C	1									1								
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C		1		2	1						1			1	1		1	
Beheira Province	C	2	2	49	45		5	1	9								1		
	D			13	4		1		1										
Cairo	C									2			5			1			
Port Said	C												4		1				
Great Britain: Scotland—																			
Dunfermline	C						1												
Glasgow	C			1															
	D			1															
Greece (see table below).																			
Iraq: Baghdad Liwa	C	2																	
Ireland:																			
Irish Free State—																			
Galway County—Oughterard	C								2										
Kerry County—Dingle	C		5																
Leitrim County—Mohill	C				9				1										

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	12	19	26	August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	Oct. 4, 1930
Ireland—Continued.																			
Irish Free State—Continued.																			
Mayo County—																			
Ballina	C			2	1		1												
Castlebar	C												1						
Swinford	C			14															
Westport	C							2		1									
Roscommon County—																			
Roscommon	C							1											
Strokestown	C							1											
Wicklow County—Shillelagh	C				4	1		1											
Latvia (see table below).																			
Lithuania (see table below)																			
Mexico: Mexico City, including municipalities in Federal District	C	4	4	6	9	2		2	1	2	2	2	3	2	2	3			
	D	1	4	3	1					1	1				1	1			
Morocco	C	38	15	11	15		4	3	4				8		2				
	D	7	3																
Palestine	C	6	1	2	2	3	1	1	1		1	1	1		1	1	1		1
Poland	C	228	243	171	117		24		12	10	15	2	7		3		12		
	D	13	15	5	11		4			1		1	1		1				
Portugal:																			
Lisbon	C		4																
Oporto	C	2	1									1							
Rumania	C	185	186	227	58	11	10	3	4	5		2	2	1					
	D	12	11	35	5	5	2	1		2									
Spain: Valencia	C				3		3									1			
	D						1									1			
Tunisia	C			6	18			14	10	2	5		3	1	1				
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P					
Natal	C	P	P	P	P	P	P	P	1	P	P	P							
Orange Free State	C	P		P	P	P	P	P	P	P	P	P	P	P					
Transvaal	C		P					P		P	P	P		P					
Yugoslavia (see table below).																			

Place		February, 1930	March, 1930	April, 1930	May, 1930	June, 1930	July, 1930
China: Harbin (see also table above)	C		37	204	240		14
Chosen: Seoul	C	17		3	43	2	3
Czechoslovakia	C	2	42	29	12	1	
Greece: Athens	C	6	3	1	3	3	6
Latvia	C				3	3	3
Lithuania	C	70	62	73	27	16	3
	D	5	4	4			
Turkey	C	3	1	3	16	2	
Yugoslavia	C	33	46	22	16	6	
	D	5	2	4	1		

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Ry., between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

BY THE UNITED STATES PUBLIC HEALTH SERVICE

VOLUME 45 :: :: NUMBER 44

OCTOBER 31 - - 1930

SPECIAL ARTICLES

The Incidence of Endemic Goiter in Northern Ireland

Effect of Size of Explant on Cultures of Fibroblasts

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UNITED STATES PUBLIC HEALTH SERVICE

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DIVISION OF SANITARY REPORTS AND STATISTICS

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PUBLIC HEALTH REPORTS

VOL. 45 OCTOBER 31, 1930 NO. 44

A NOTE ON THE INCIDENCE OF ENDEMIC GOITER IN NORTHERN IRELAND

By ROBERT OLESEN, *Senior Surgeon*, and PAUL A. NEAL, *Assistant Surgeon, United States Public Health Service*

Opinions vary widely as to the incidence of endemic goiter in Northern Ireland. According to some of the physicians practicing in this section, simple goiter is rare; others assert that the disease is relatively frequent. Probably an intermediate estimate is more in accordance with the facts.

During the course of routine physical and mental examinations of aliens applying for visas to enter the United States from Northern Ireland, the writers were able to observe the thyroid status of each applicant. From July, 1929, to June, 1930, the thyroid glands of 4,648 male applicants and 3,992 female applicants were examined. The findings, classified according to arbitrary standards previously employed on a large scale in the United States, afford interesting information concerning the incidence of simple goiter in the northern part of Ireland. It also makes possible a comparison of goiter incidence in the new and old worlds by the use of similar methods of examination and record.

Northern Ireland, or Ulster, comprises six counties and is that portion of Ireland lying north of the Irish Free State. Practically all of the persons examined came from this northern section, only a few residing in the border counties of the Free State. The goiter statistics are of particular interest, because of the proximity of the ocean to much of this territory, an association believed by some to confer considerable protection against goiter because of the supposed iodine-enrichment of drinking water and foodstuffs. However, if these factors are effective, their extent is difficult of determination, for simple goiter is found among individuals coming from all parts of Northern Ireland.

The method of examining and classifying thyroid enlargements has been described in previous publications.[1,2] These same methods

[1] Robert Olesen: Thyroid survey of 47,493 elementary school children in Cincinnati. Pub. Health Rep., Vol. 39, No. 30, pp. 1777-1802 (July 23, 1924). (Reprint No. 941.)

[2] Robert Olesen: Endemic goiter in Colorado. Pub. Health Rep., Vol. 40, No. 1, pp. 1-29 (Jan. 1, 1925). (Reprint No. 983.)

were employed during the examinations made in Belfast, to which point all applicants for visas came.

Results.—In all, 4,648 males and 3,992 females, ranging in age from a few weeks to more than 80 years, were examined. Thus, 75 males and 61 females under 5 years of age, as well as 138 males and 249 females over 50 years of age, were included in the examinations.

TABLE 1.—*Numbers and degrees of thyroid enlargement (by age groups) among applicants for visas in Belfast, Northern Ireland*

4,648 MALES

Age group	With enlarged thyroids						Normal	Total
	Degree of enlargement				Total	Per cent		
	Very slight	Slight	Moderate	Adenomas				
Under 5	1			1	2	2.6	73	75
5 to 9	1				1	1.2	78	79
10 to 14	6	1			7	11.5	54	61
15 to 19	92	18	3		113	14.6	660	773
20 to 24	205	41	8	6	260	15.3	1,434	1,694
25 to 29	79	9	5	6	99	10.8	816	915
30 to 34	34	5		2	41	9.1	409	450
35 to 39	18	2		4	24	9.5	227	251
40 to 44	1			1	2	1.6	120	12[illegible]
45 to 49	1	1			2	2.2	88	90
Over 50				1	1	.7	137	138
Total	438	77	16	21	552		4,096	4,648
Per cent	9.4	1.6	.3	.4		11.8		100.0

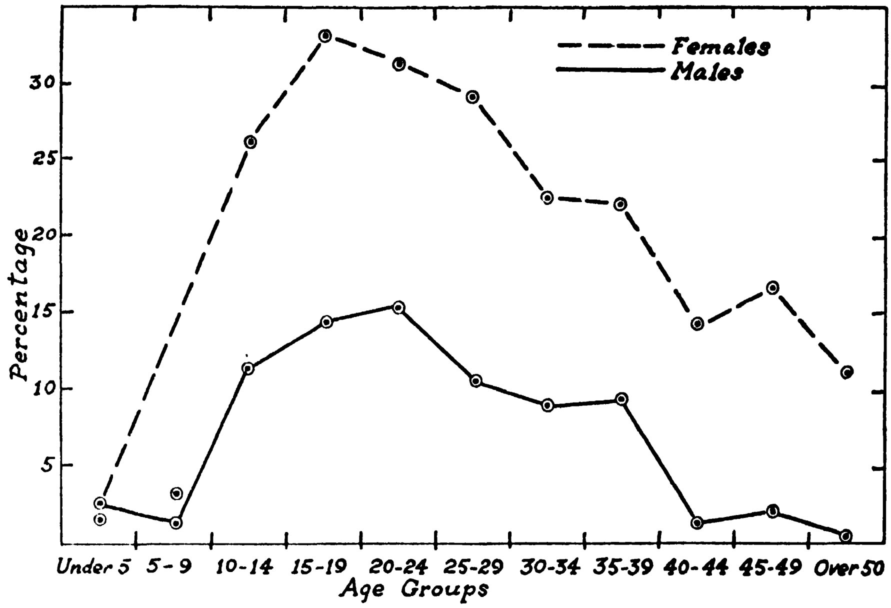
3,992 FEMALES

Age group	With enlarged thyroids							Normal	Total
	Degree of enlargement					Total	Per cent		
	Very slight	Slight	Moderate	Marked	Adenomas				
Under 5					1	1	1.6	60	61
5 to 9	2					2	3.2	60	62
10 to 14	14	2	3		1	20	26.3	56	76
15 to 19	197	94	32		10	333	33.1	662	1,005
20 to 24	231	106	38		8	383	31.6	829	1,212
25 to 29	112	43	18	2	8	183	29.2	444	627
30 to 34	48	16	4	1	5	74	22.9	250	324
35 to 39	23	10	3		6	42	22.2	147	189
40 to 44	9	2	1		3	15	14.4	89	104
45 to 49	5	3	2		4	14	16.9	69	83
50 and over	9	6	2		11	28	11.2	221	249
Total	650	282	103	3	57	1,095		2,887	3,992
Per cent	16.3	7.1	2.5	0.07	1.4		27.4		100.0

The results of this thyroid survey are set forth in Table 1, the sex, age groups, and degrees of thyroid enlargement being indicated. It will be noted that there were 552 definite thyroid enlargements among the 4,648 males examined, a percentage of 11.8. However, the greater number of these enlargements, amounting to 9.4 per cent, were very slight in character The number of adenomatous enlarge-

ments among the males was 21. Among the 3,992 females inspected there were 1,095 enlargements of the thyroid gland, a percentage of 27.4. The number of adenomatous enlargements encountered among the females was 57. As is usually the case, more enlargements were found among the females and the enlargements were of greater size than among the males.

The data are displayed graphically in the chart. It will be seen that the percentage incidence is consistently greater among females of each age group after the age of 9 years. The greatest amount of goiter in both sexes is found between the ages of 15 and 24 years.



Percentage of all grades of thyroid enlargement found among 4,648 males and 3,992 females, by age groups, in Northern Ireland, examined during the period July, 1929–June, 1930

After this period there is a comparatively rapid decline in the incidence rate among males. However, among the females, goiter continues to prevail to a considerable extent even after the age of 50. It is evident that among females, at least, goiter prevails to a considerable extent in northern Ireland.

Goiter and intelligence.—In view of the interest which still attaches to the possible relationship between intelligence and goiter, the special observations made on this point in Belfast will prove of interest. One of us (R. O.), after a comparison of percentile ranks of thyroid-normal and thyroid-enlarged school children in Cincinnati, Ohio, reached the conclusion that the differences were not of sufficient magnitude to warrant the conclusion that thyroid-normal individuals have a keener mentality than those whose thyroids are enlarged.[3]

[3] Robert Olesen and Mabel R. Fernald: Endemic Goiter and Intelligence. Pub. Health Rep., Vol. 41, No. 21, pp. 971–986 (May 21, 1926). (Reprint No. 1081.)

This conclusion is amply supported by the experience in Belfast, where, after intensive intelligence tests applied to approximately 600 persons, 142 were finally certified as mentally defective. Among the 112 defective females there were 31 thyroid enlargements, a percentage of 27.7. Among the 30 males who were mentally defective there were only 4 thyroid enlargements, a percentage of 13.3. Comparison of these figures with the percentages of general goiter incidence among the individuals regarded as mentally normal discloses a very close approximation. Therefore, it must again be concluded that intelligence is not demonstrably associated with the presence or absence of thyroid enlargement.

Conclusion.—In a previous publication,[4] it was tentatively suggested that when the percentages of all degrees of simple thyroid enlargement, as determined by Public Health Service standards, range between 10 and 20 per cent among the males and between 20 and 30 per cent among the females, widespread prophylaxis is probably an optional public health measure. However, these tentative suggestions should not deter physicians and public health authorities from providing prophylaxis and treatment in specific instances. In view of the considerable incidence of goiter among females between 19 and 24 years of age in Northern Ireland, it would appear particularly desirable that prophylactic measures be instituted prior to that time.

THE INFLUENCE OF THE SIZE OF THE EXPLANT UPON CULTURES OF CHICK FIBROBLASTS IN VITRO

By W. R. Earle, *Cytologist*, and J. W. Thompson, *Assistant Chemist, Division of Pharmacology, National Institute of Health (formerly Hygienic Laboratory), United States Public Health Service*[1]

INTRODUCTION

The recognition and isolation of any factor playing a major rôle in the metabolism of the cell or in the initiation of cell cleavage is obviously of great importance. Not only is it of significance because of its biological interest, but also because of its importance in defining more closely the factors responsible for the differences in the relative rates of cell cleavage in normal and malignant tissues, and the differences in the degree of organization found in these tissues.

Burrows (2), in 1923, made the observation that isolated single connective tissue or mesenchyme cells planted in plasma showed no signs

[1] This work has been carried on under the supervision of Dr. Carl Voegtlin, Chief of the Division of Pharmacology. The authors wish to express their thanks to Professor Voegtlin for his help and suggestions during the progress of the investigation. They wish also to express their appreciation of the valuable technical assistance of Mr. E. L. Schilling in carrying on this work.

[4] Robert Olesen: Endemic Goiter. Pub. Health Bull. No. 192, p. 46, 1929.

of growth. This same observation was made by Fischer (4, 6) in 1923, who used a 4-month old strain of fibroblasts from the chick. He found that such isolated cells showed no signs of cell cleavage and that the cells eventually degenerated and died. He also found that if the transplanted cell clump consisted of a few scattered cells, no growth took place, and the cells took on the aspects of degeneration at a time when the control culture, containing a much greater number of cells, seemed to be in perfect condition. In describing this degeneration he noted the accumulation of vacuoles and fat "granules" within the cells.

In trying to account for this lack of cell cleavage and occurrence of degeneration, Fischer later (1925) worked on the hypothesis that for the initiation of cell cleavage direct protoplasmic connection or anastomosis with a certain number of homologous cells of the same species was in some way significant (5). He succeeded in showing that in large cultures of fibroblasts there did appear to be some definite interaction of the cells of the culture. This interaction resulted in a definite rhythm in the occurrence of mitosis in the cells of the culture (5, 6).

In an attempt to obtain cultures from single isolated fibroblasts from the heart of the chick, our attention was attracted by a different phase of the same problem. As a result of this, an attempt was made to study the changes in the granules and lipoid[1] droplets of isolated cells, and to correlate these changes with those observed in the cells of cultures from explants of larger sizes. The results of this investigation appear to us to be of some value in understanding the conditions which accompany, and possibly result in, the death of isolated fibroblasts in culture. They also appear to be of interest in understanding conditions which prevail in cultures of fibroblasts from larger explants planted under similar conditions. The data obtained are presented in this article.

MATERIALS AND METHODS

In this work two types of fibroblasts have been used—the first from freshly explanted heart tissue of 9-day chicks, the second from a stock strain of fibroblasts, from the same source, kept growing *in vitro* in this laboratory for the past nine months.

The work has consisted of an examination of the rates of growth of cultures planted from graded sizes of explants taken from these two types of tissues, and the correlation of these rates with the cell changes observed in the cultures.

[1] In this paper the term "lipoid" is used in a general sense similar to that in which it is used by Baker and Carrel (1). In those cultures tested, the lipoid droplets within the cell showed a high refractive index, stained with Sudan III, and were soluble in chloroform or other fat solvents.

The method of preparation of cultures from the fresh chick hearts was as follows: The freshly removed heart was washed in Tyrode solution [2] adjusted, just before using, to a pH of about 7.4. A series of fragments was then cut from the heart wall with an iridectomy knife. The size of each fragment was 2 by 1 by 1 mm., or a little smaller. These fragments were set aside in Tyrode solution until wanted. As needed, a fragment was taken out and cut so as to give two fragments each 1 by 1 by 1 mm., or a little smaller. One of these was set aside as representing the largest size of explant of the set, size 1; the other was again divided into two approximately equal parts. One of these halves was set aside as the explant of size 2, and the other again divided, and so on until from the one original tissue fragment had been obtained five explants ranging in decreasing size from the largest, which was about the size of the normal explant generally used, down to the smallest size, barely visible to the eye. This smallest was cut such a size that after 48 hours' incubation from 1 to about 40 cells would have wandered out from it.

These explants were planted in hanging drops of medium on mica cover slips. This medium was made up of equal volumes of chicken plasma and chick embryo juice. Each solution was measured from a calibrated capillary pipette, and the two were mixed on the mica cover slip and spread over a circular area 20 mm. in diameter. The explant was placed in the still liquid media by means of two small iridectomy knives. As the total volume of media used was approximately 0.013 c. c. for each culture, the drop formed a very thin layer over a relatively large surface. By actual measurement of a number of cultures, this layer of medium was approximately 110 μ thick, near its center.[3] This shape and size of clot was chosen as being so thin that cells at all levels within the clot could be considered as under approximately comparable conditions of oxygen and CO_2 tension.

After planting a culture in this manner, the mica cover slip, with its adherent culture, was inverted over the well of a hollow-ground slide and was sealed to it with vaseline. An outer seal of paraffin was also put on.[4]

In the preparation of cultures from the stock strain of fibroblasts, several technical difficulties presented themselves. In order to avoid these, the following technique was employed: The cultures from which it was desired to obtain explants were planted as usual in hanging drops of embryo juice and plasma. However, instead of

[2] The composition of the Tyrode solution used was as follows: NaCl, 8 g.; KCl, 0.2 g.; $CaCl_2$, 0.2 g.; $NaHCO_3$, 1 g.; NaH_2PO_4, 0.05 g.; glucose, 1 g.; water, 1,000 c. c.

[3] This measurement was made by means of the fine adjustment of a microscope, the fine adjustment head being calibrated to read single micra. This measurement assumed the refractive index of the plasma clot to be 1.4.

[4] The slides used to cover these cultures had a polished concavity of about 25 mm. diameter. The volume of this concavity was 0.5 c. c.

the hanging drop of media being attached directly to the under surface of the mica cover, it was attached to a small disk of mica about 16 mm. in diameter. This was, in turn, attached to the mica cover slip by means of a small drop of embryo juice or Tyrode solution; capillarity held the mica disk in position. At the time of cutting of the graded sizes of explants, 48 hours after planting these parent cultures, the cover of each parent culture was raised, and the inside disk of mica, with its adherent clot, was removed and floated for five minutes or so, face down, in freshly adjusted Tyrode solution. Upon removal from this solution the culture was drained of Tyrode solution, by touching it to a pad of sterile gauze, and was then placed in position under a binocular dissecting microscope. By means of a sharp iridectomy knife, a series of radial and peripheral cuts was made in the culture. These produced a series of explants of graded sizes all from the same culture. These cuts were made so that the largest size fragment consisted of ½ the whole culture; the second size represented about ¼ to ⅙, the third $\frac{1}{12}$ to $\frac{1}{24}$, the fourth about $\frac{1}{36}$ to $\frac{1}{64}$. The size of the fourth was such as to allow the migration of about 1 to 40 cells in 48 hours. A still smaller size of explant was planted in some cases. From this smallest size, size 6, no migration was ever seen to take place.

As will be noted, cultures of fresh heart were planted in sets of 5 cultures each, each culture of which represented a different size of explant. Stock fibroblasts, however, were planted in sets of only 4 cultures each. Upon examination of the data it was found that cultures from explants of sizes 1 and 2 of both types of cells were comparable, within the limits of accuracy of the technique, while cultures from explants of sizes 3 and 4 of the stock fibroblasts seemed comparable to cultures from explants of sizes 4 and 5 of the fresh heart. In order to place slides from the two types of tissues on a comparable basis, cultures from explants of sizes 3 and 4 of the stock strain of fibroblasts have been reclassified as sizes 4 and 5, respectively, making them comparable to sizes 4 and 5 of the fresh heart explants.

The plasma used in planting all of these cultures was taken from hens 5 to 18 months old. No substantial differences in the cell growth were noted as a result of the age of the hen. All lots of plasma were kept sealed under vaseline at 4° C. Most of the lots of plasma were only 2 or 3 days old when used; none was more than 9 days old.

The embryo juice was prepared from 9-day chicks, freshly removed from the eggs. The eyes and membranes of these chicks were removed and the remaining tissues were washed with Tyrode solution, then minced and centrifugalized. The supernatant, slightly viscous fluid so obtained was then decanted, frozen three consecutive times,

and stored under a vaseline seal at 4° C. until needed. All embryo juice used was less than 48 hours old.

All cultures were incubated at 38.5° C.

Immediately after preparation, the outlines of the cultures were traced by means of a projectoscope. Similar tracings were made thereafter at intervals of a day or so. The area of each tracing was measured by means of a planimeter, as in Fischer's well known method, and from these data the change in the area of each culture was determined and the areas of the cultures plotted. The curves so obtained were studied separately. From the individual curves have been synthesized the composite curves presented in Charts 1 and 2. These composite curves represent the modes of the curves of the separate cultures studied.

Further, at various intervals of time one or more sets of cultures from different sized explants were sacrificed. These cultures were closely examined unstained at 38.5° to see the general condition of the cells, and then supravitally stained with 1/20,000 neutral red, in unbuffered Locke solution,[6] after which more detailed studies were made on the condition of the cell granules, fat droplets, etc. The staining process was carried out at 38.5°, and the dye was never allowed to act longer than a few minutes, in order to insure a minimum of change in cell structures through the action of the dye. Some of the cultures were also stained with Sudan III in order to study the fat droplets more closely; but in general this was not necessary, except for the smallest sizes of droplets, as the unstained highly refractile droplets showed up quite sharply in contrast with the neutral red absorbing granules of the cell.

Photographic records were kept of almost every culture. Two regions were usually photographed in each. Photographs were generally made at a magnification of 365X, using 8 by 11 cm. plates. Plates 1 to 8 show typical pictures selected from these routine photographs.

Using this technique, about 75 cultures, comprising three series, planted from fresh heart, and about 85 cultures, comprising 4 series, planted from stock fibroblasts, have been studied. A number of other series of similar cultures were also examined. The data from these are not included in those presented, as conditions under which these series were cultivated or examined were less accurately standardized, or the cultures were not so carefully studied. Even these cultures, however, showed the same general changes as those shown by the cultures of the 7 series more closely studied.

In analyzing the data obtained from this study, the change in the volume of the lipoid droplets per cell was found to be so striking that it was thought to be of interest to attempt to portray it graphically

[6] The composition of the Locke solution was as follows: NaCl, 9 g.; KCl, 0.42 g.; $CaCl_2$, 0.24 g.

on some quantitative or semiquantitative basis. To do this all photographs of cultures were critically examined, and from each representative photograph a representative cell or group of representative cells was selected. In each cell or group of cells the number of lipoid droplets of each diameter was counted. The diameter of each droplet was measured by means of a scale graduated to millimeters. From these data, assuming each lipoid droplet to be a sphere, the volume of free lipoid material per cell was integrated.

One precaution was found necessary with this method. From the photographs it was obvious that the largest sizes of lipoid droplets were markedly flattened, and could not be considered as perfect spheres. Generally, though, on the plates showing such lipoid droplets there were cells which appeared to contain what seemed to be comparable amounts of lipoid material, but in somewhat smaller drops. In such instances these cells were chosen for measurement. The results of these approximations are presented in charts 3 and 4, the curves being drawn to show the modes of the volume of lipoid material per cell. The curves for the smallest sizes of explants are omitted from these charts, as curves for these sizes were interrupted by the early death of the cells.

EXPERIMENTAL

CHANGES IN THE AREA OF THE CULTURES

When changes in areas of the cultures were traced, it was observed that, following a short latent period after explantation, there was a rapid initial increase in the areas of all cultures planted from explants of sizes 1 to 5, inclusive. (Charts 1 and 2.) Cultures from explants of size 6 showed no migrations at any time. No difference was noted in the time of onset of this migration for the various sizes of explants from 1 to 5. At 20 hours this increase in areas of cultures from all sizes of explants except size 5 was quite marked, and even size 5 showed some slight increase.

From this time on, through about 50 hours after explantation, the areas of all cultures except those from explants of size 5 and size 6 increased rapidly. Those from size 5 explants showed relatively slight increase, and at approximately 50–90 hours after explantation augmentation of the areas of these cultures had ceased. After this time there was often a slight decrease in the areas of these cultures. This decrease apparently resulted from cell contraction and death.

With the cultures from the largest sizes of explants, the increase of areas of the cultures continued rapidly until about 70–120 hours after explantation. At this time the rates of increases of areas became markedly less, and by 160 hours after explantation they had become very slight indeed.

At the time the cultures had reached their maximum areas, cultures from explants of size 1 were, almost without exception, the largest of

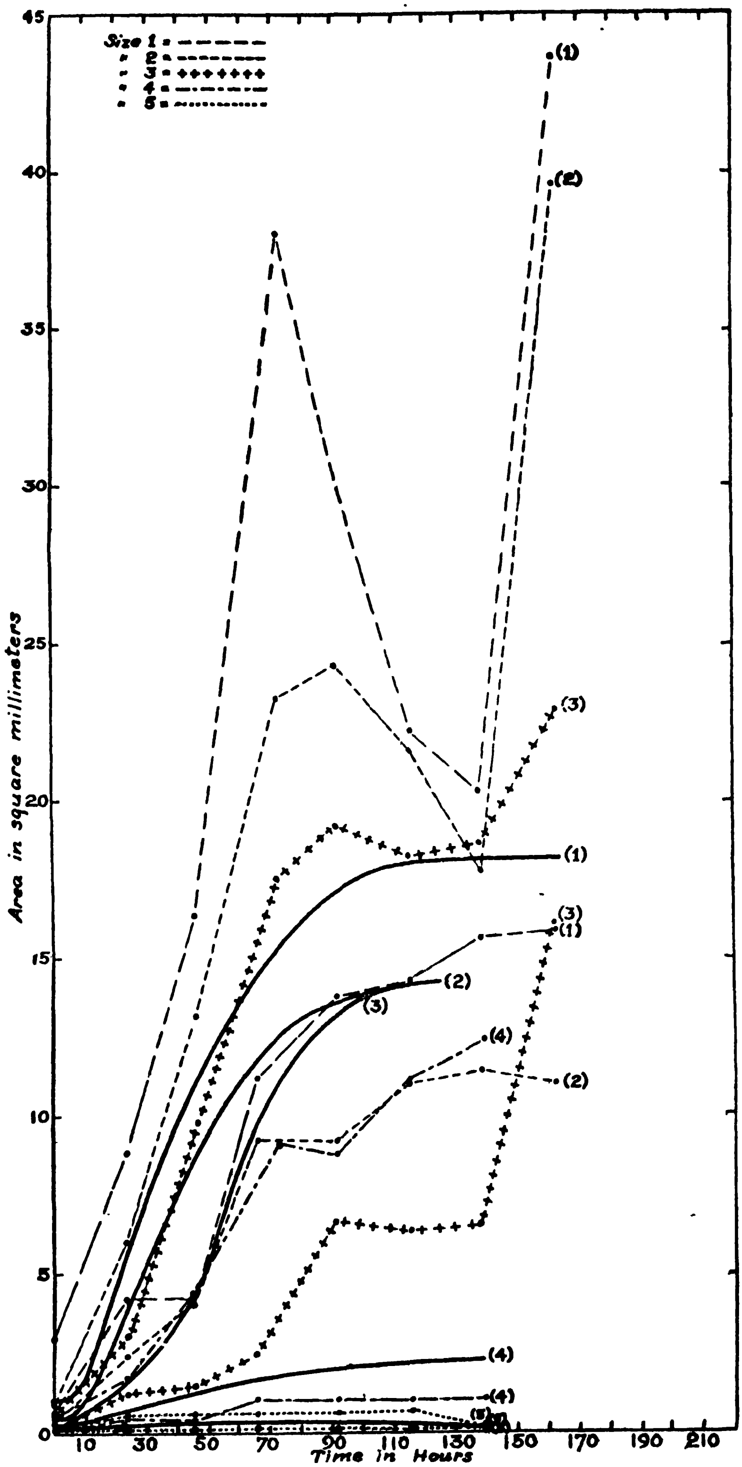


CHART 1.—Areas of cultures from explants of fresh heart, plotted as a function of time. The heavy solid lines, 1 to 5, show the modes of the areas of the cultures, each line representing the mode of the areas of cultures from the same sized explant; the size is indicated by the number at the right hand end of the line. The lighter broken lines represent the limits of the range of areas of cultures seen from each size of explant. These lines are paired, each pair being plotted with the same symbols. Of each pair, the upper line represents the maximum areas of any cultures examined, the lower line the minimum. These lines are numbered to correspond with the heavy lines, the numbers at the right indicating the size of the explant.

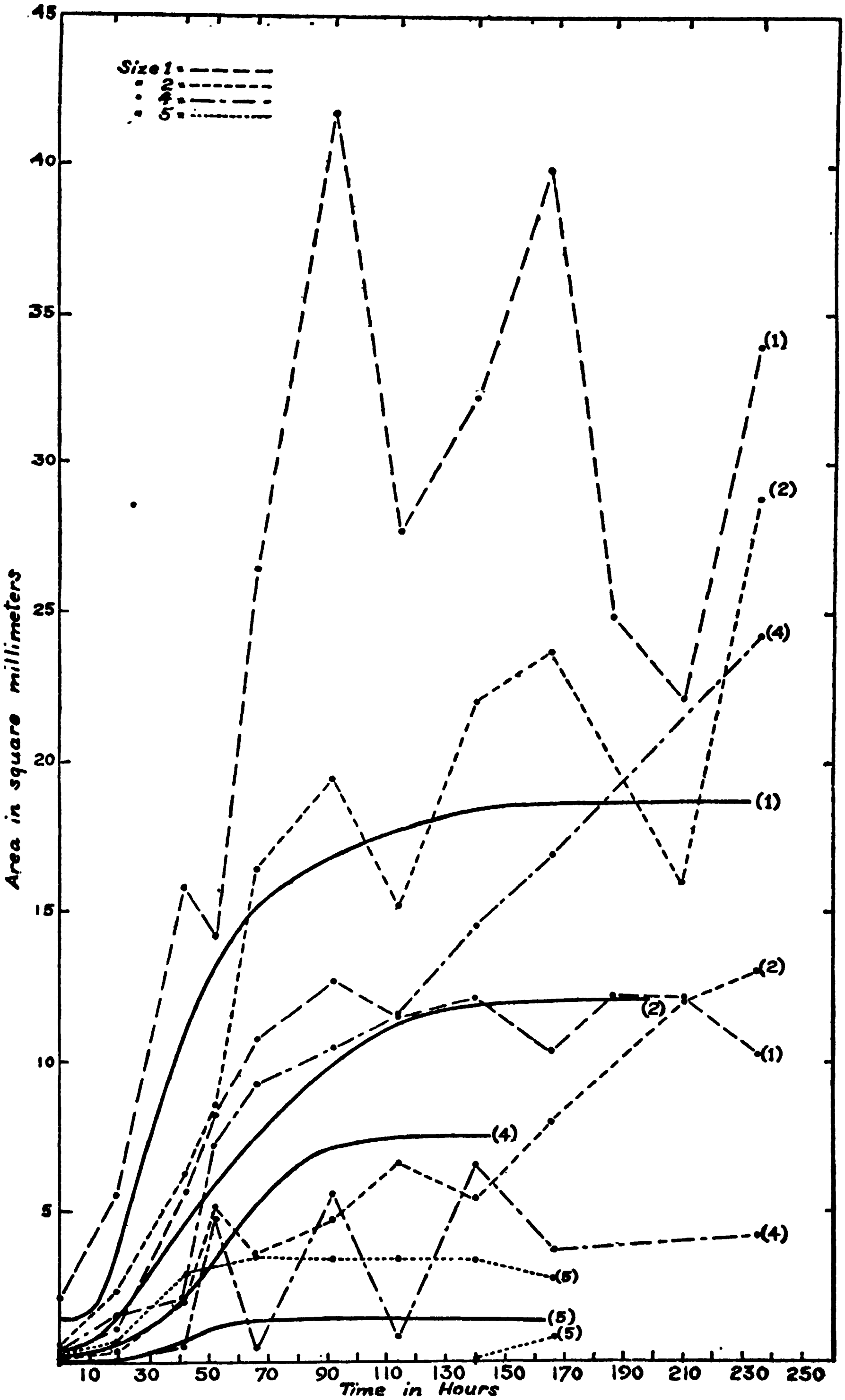


CHART 2.—Areas of cultures from explants of stock fibroblasts, plotted as a function of time. The heavy solid lines 1, 2, 4, and 5 show the modes of the areas of the cultures, each line representing the mode of the areas of cultures from the same sized explant; the size is indicated by the number at the right hand end of the line. The lighter broken lines represent the limits of the range of areas of cultures seen from each size of explant. These lines are paired, each pair being plotted with the same symbols. Of each pair, the upper line represents the maximum areas of any cultures examined, while the lower line represents the minimum. These lines are numbered to correspond with the heavy lines, the numbers at the right indicating the size of the explant.

any; those from size 5 were the smallest, and those from size 4 the next smallest. Sizes 2 and 3, however, showed more variation, and in many cases the final area of the culture from size 3 explants (fresh heart) was equal to or greater than that of cultures from size 2. A similar tendency to show a larger final area was seen in one or two instances in cultures from size 4 explants of stock fibroblasts, but this tendency was less marked and did not appear at all in cultures from explants of size 5.

CELL CHANGES

Time 0 to 24 hours.—During the first 24 hours of incubation, as stated, all sizes of explants showed extensive migration. In the cultures from explants of fresh heart, each of these migrated cells showed about 50 to 100, often slightly angular, neutral red absorbing granules [6] of 0.9 to 1.2 μ diameter. The cultures from stock fibroblasts showed a somewhat greater number of granules, as may be seen by comparing Figures 1 and 10. In many of these cells the granules were too numerous to count and were estimated at about 200 to 300 in number. These granules were probably a little smaller in size than those in the cells from fresh heart explants.

The more peripherally situated cells sometimes showed a slightly greater irregularity in the size of their neutral red absorbing materials. (Fig. 11, Pl. 4.) Some of these cells showed occasional neutral red absorbing vacuoles up to about 2 μ in diameter.

The cells which had migrated out from the three or four largest sizes of explants of fresh heart showed an extremely small volume of lipoid droplets. Sometimes a cell would contain one droplet, sometimes more, but in either case the total volume of lipoid droplets was less than that of two or three droplets of 1 μ diameter. The cells which migrated out from the explants of stock fibroblasts generally showed a somewhat greater amount of lipoid material, but even in these cells there was very little. The occurrence of this lipoid material in cells lying at different distances from the explant was fairly uniform for both of the above types of cultures at this time, although some cultures showed a slight tendency for the more peripherally located cells to show a little more lipoid. (Fig. 11, Pl. 4.)

Cells which had migrated out from explants of size 5 showed, almost without exception, at least a slightly greater volume of lipoid droplets within each cell than did those from the larger size explants. (Fig. 12, Pl. 4.)

Time 24 to 70 hours.—During the period from 24 to 70 hours, the more centrally situated cells which had migrated out from the larger

[6] Throughout this article the term "neutral red absorbing granule" is used to denote those particles of neutral red absorbing material which had a maximum size of about 1.2 μ, and a minimum size of 0.3 or 0.4 μ. These particles were frequently irregularly angular in shape. Particles smaller than these are termed "dust." Particles larger than 1.2 μ were almost without exception spheres or spheres more or less deformed through pressure and are termed "vacuoles."

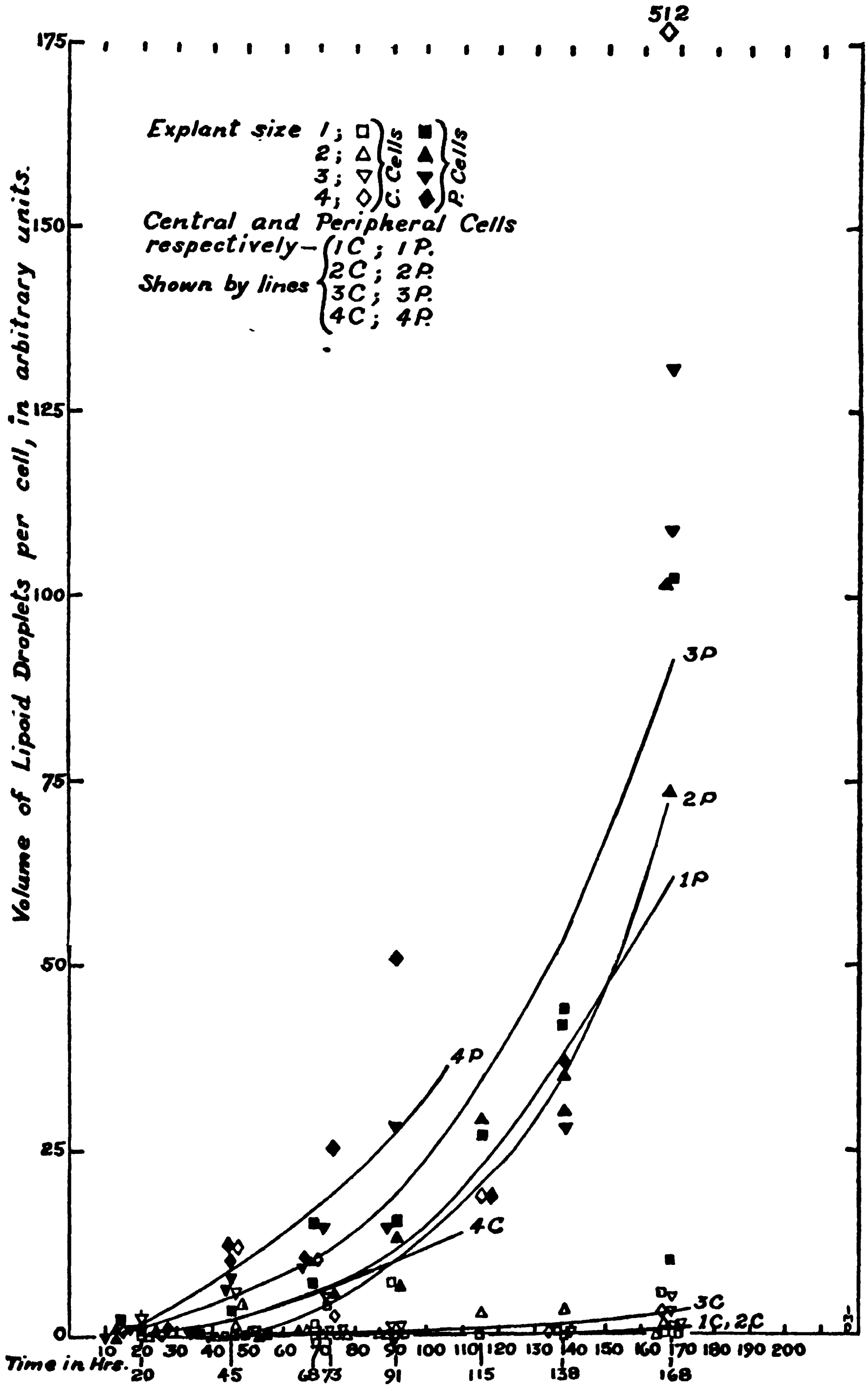


CHART 3.—Total volume of lipoid droplets per cell in cells of cultures from different sizes of explants of fresh heart, plotted as a function of time. For each size of explant the volume of lipoid in the cells from each of two different regions of each culture has been plotted—the most peripheral region (P) (indicated by solid black points) and the region just peripheral to the original area of the explant (C) (points with clear centers). The points for any one size of explant are all the same shape. The graphs indicate the modes of the various sets of points. The number at the right end of each line indicates the size of the explant the points of which fix that line. The volume of lipoid droplets per cell is plotted in arbitrary units, each of which represents about 20 cubic micra. The points were often so densely clustered that it was necessary to spread them slightly horizontally. The lowest row of figures along the horizontal axis indicate the times at which examinations were made.

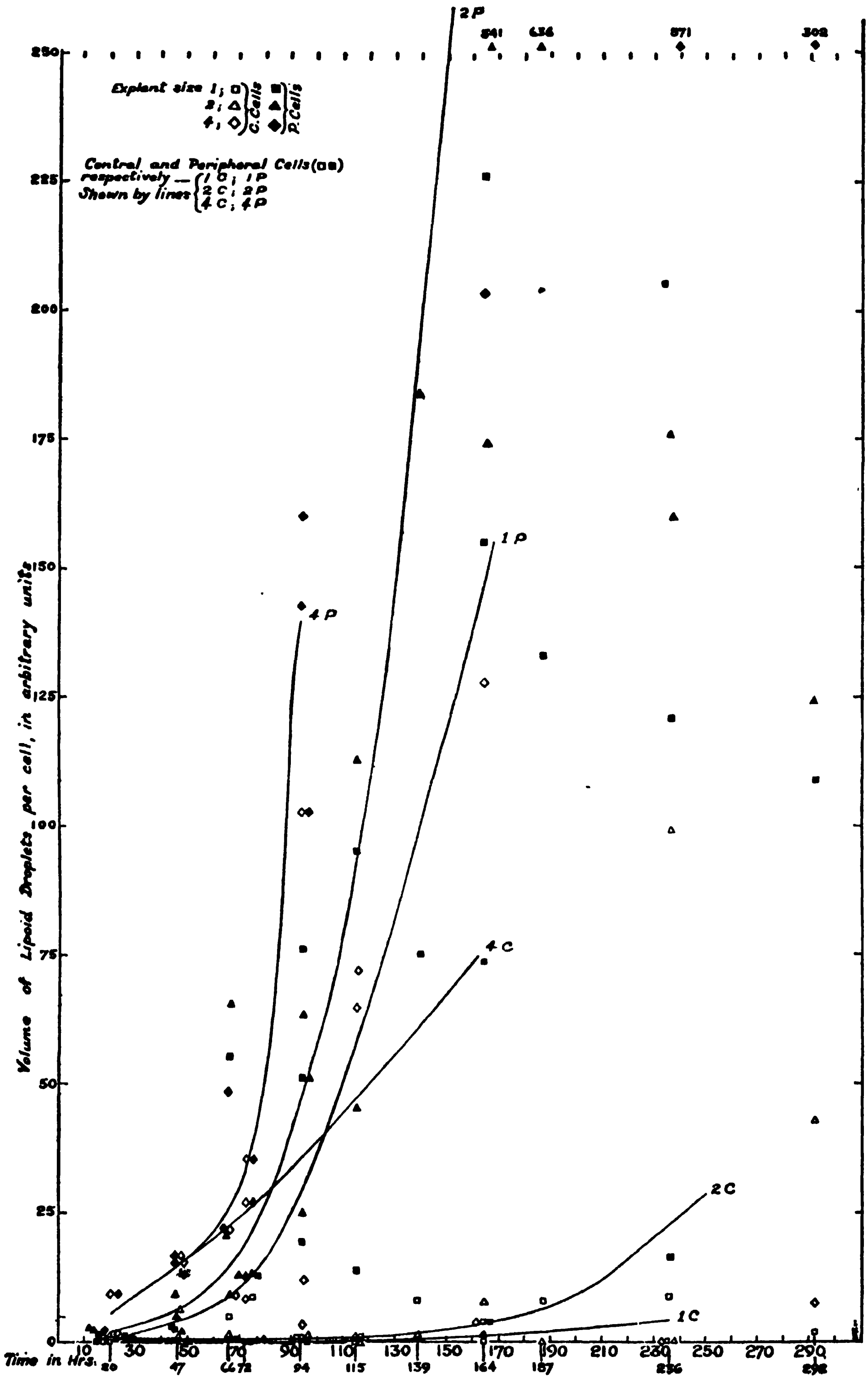


CHART 4 (See explanation on opposite page)

sizes of explants, sizes 1, 2, 3, and some of 4, became more sheetlike. (Figs. 2, 13, Pls. 1 and 5.) This was apparently due to the fact that many of the cells were located on the surfaces of the plasma clot. The more peripherally located cells, however, though generally broad, were less sheetlike and appeared more in spindle or flattened blunt spindle shapes. (Figs. 3, 14, Pls. 1 and 5.) The cells closer to the explant appeared perfectly normal in shape. Of the more peripheral cells, however, even at this time occasional ones were observed which showed marked signs of rounding up. A few of them appeared "motheaten," while a few were dead and had more or less disintegrated.

During this period, from 24 to 70 hours, the neutral red absorbing granules of the cells from the explants of fresh heart became much more prominent as a result of an increase in the number of granules per cell. (Compare Figs. 1 and 2, Pl. 1.) The cells from the cultures of stock fibroblasts showed a less marked, if any, increase, apparently due to their originally greater number of granules. (Compare Figs. 10, 13, Pls. 4 and 5.) Cultures of both types, following this increase, showed about 150 to 300 neutral red absorbing granules, of approximately 1μ diameter, per cell.

The variation in the number of neutral red absorbing granules per cell between different cells in the peripheral part of the culture, was becoming marked at this time. (Fig. 14, Pl. 5.) Some of these cells showed as many granules as the more centrally situated cells; some showed very few. Those cells which showed so few generally showed large amounts of free lipoid. Besides this variation in the number of granules they contained, the peripheral cells showed a greater range of size of neutral red absorbing materials than did the more central cells. While the central cells showed granules fairly uniform in size, some of the peripheral cells, generally those which contained fewer neutral red absorbing granules, showed some neutral red absorbing vacuoles of 2 or 3μ in diameter.

There was, during this period, possibly some slight decrease in the volume of lipoid droplets present in the cells situated just peripheral to the region of the original explant in cultures from the larger sizes of explants of stock fibroblasts. For the cultures from the larger sizes of explants of fresh heart, the similarly situated cells showed little change in the volume of lipoid droplets contained in each cell. On the other hand, for the more peripherally situated cells of both types

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EXPLANATION OF CHART 4.—Total volume of lipoid droplets per cell in cells of cultures from different sizes of explants of stock fibroblasts, plotted as a function of time. For each size of explant the volume of lipoid in the cells from each of two different regions of each culture have been plotted—the most peripheral region (P) (indicated by solid black points) and the region just peripheral to the original area of the explant (C) (indicated by points with clear centers). The points for any one size of explant are all the same shape. The lines drawn indicate the modes of the various sets of points. The number at the right-hand end of each line indicates the size of the explant the points of which fix that line, while the letters (P) and (C) indicate the lines for the most peripheral cells and the more central cells, respectively. The volume of lipoid droplets per cell is plotted in arbitrary units, each of which represents about 20 cubic micra. These points were often so densely clustered that it was necessary to spread them slightly horizontally. The lowest row of figures along the horizontal axis indicates the times at which examinations were made.

It will be noted that in this figure, curves were plotted only to about 170 hours, while after this time there was some evidence of a drop in the amount of lipoid in some of the cells.

of cultures the total volume of lipoid droplets per cell increased rapidly. (Compare Figs. 2, 3, Pl. 1; 13, 14, Pl. 5.) This increase showed several constant peculiarities as follows: (1) In the cultures from the larger size explants, a relatively broad zone of migrated cells surrounding the area of the original explant showed an exceedingly small volume of lipoid droplets per cell. The most peripheral cells of the culture, however, contained much larger droplets and generally more droplets. (2) In these most peripherally situated cells the volume of lipoid droplets per cell became ever greater as time passed. (3) In these cells at any one time, the volume of lipoid droplets per cell was generally somewhat greater for cells from explants of smaller sizes. (4) At any one time the width of this zone of lipoid-filled peripheral cells, relative to the radius of the culture, became increasingly great as cultures from smaller and smaller explants were studied. With explants of size 5 the volume of lipoid in each cell was maximal; all cells were of this lipoid filled "peripheral" type.

DESCRIPTION OF PLATES[1]

In all of these photographs the pointer, shown in each photograph, is on the side of the field nearest the explant. All cells were stained with supravital neutral red, and were photographed at 38.5° C. All pictures are magnified 365X. The neutral red absorbing materials appear black, the lipoid droplets white. While the nuclei also show up white, they are less refractile than the lipoid droplets and are easily distinguished from them.

Culture series A-9. Cultures from Fresh Heart of 9-day Chick

PLATE 1

Fig. 1.—Culture from explant of size 1; 18 hours after explantation. This shows the first outgrowth of fibroblasts from the explant of fresh heart. There were practically no lipoid droplets present and only a relatively small number of neutral red absorbing granules per cell. There was no discernible difference between the centrally and peripherally situated cells. The black area at the left represents the explant.

Fig. 2.—Culture from explant of size 1; 68 hours after explantation. This shows the cells which were just peripheral to the explant; the explant is shown at the extreme left. Note a slight increase in the number of neutral red granules per cell, and the almost complete absence of lipoid droplets.

Fig. 3.—Culture from explant of size 1; 68 hours after explantation. This is the same culture shown in Figure 2. This figure shows the cells at the periphery of the culture. There were marked variations in the amount of neutral red absorbing materials per cell; some cells showed little, others showed as much as the more centrally situated cells. The cells showed a much greater volume of lipoid droplets than did the more centrally situated cells of the same culture, however.

In the culture from the explant of size 5 at this time, the cells were dead and so badly disintegrated that they could not be satisfactorily photographed.

PLATE 2

Fig. 4.—Culture from explant of size 1; 166 hours after explantation. This figure shows the cells just peripheral to the explant. These cells had degenerated and most of them were dead. Most of them were rounded up and appeared somewhat coagulated. The majority of them showed no trace of neutral red absorbing materials and almost no lipoid droplets.

Fig. 5.—Culture from explant of size 1; 166 hours after explantation. This is the same culture as is shown in Figure 4. This figure shows the cells which were

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[1] The authors are extremely grateful to the Army Medical Museum for printing the negatives of the photographs reproduced in these plates.

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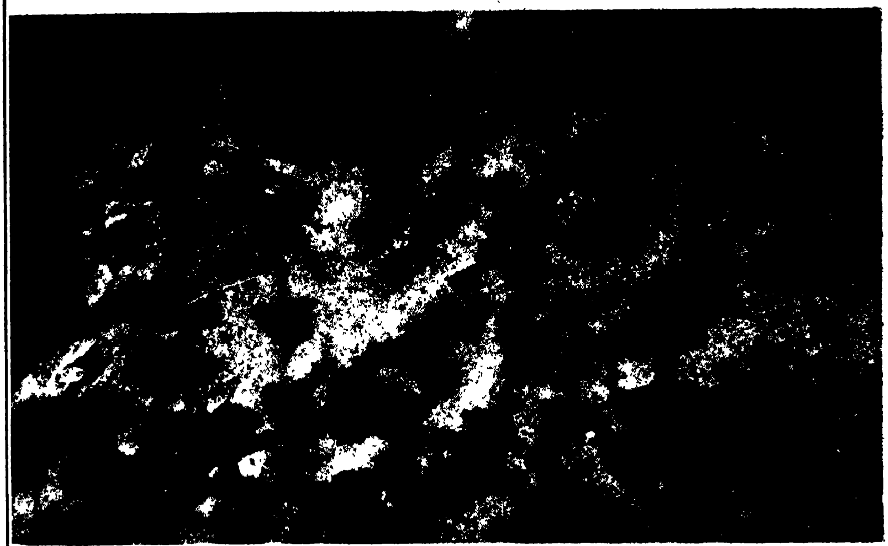

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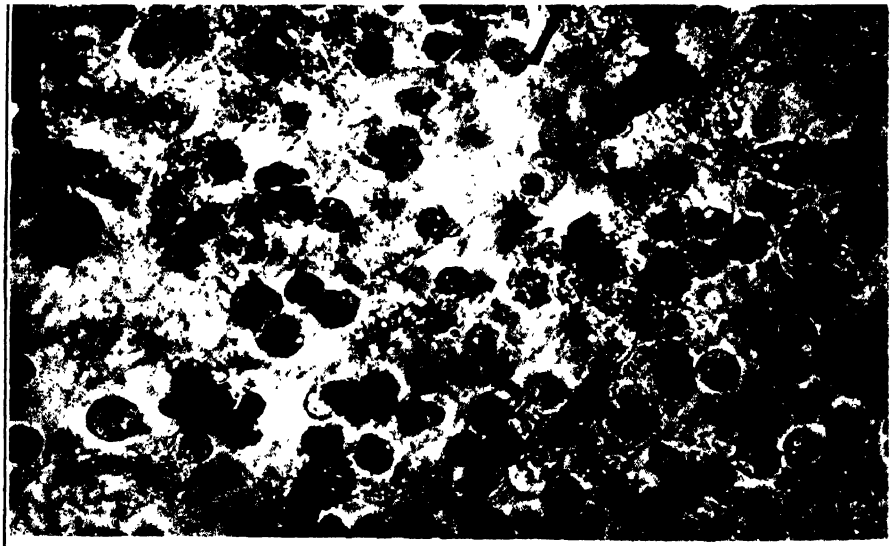

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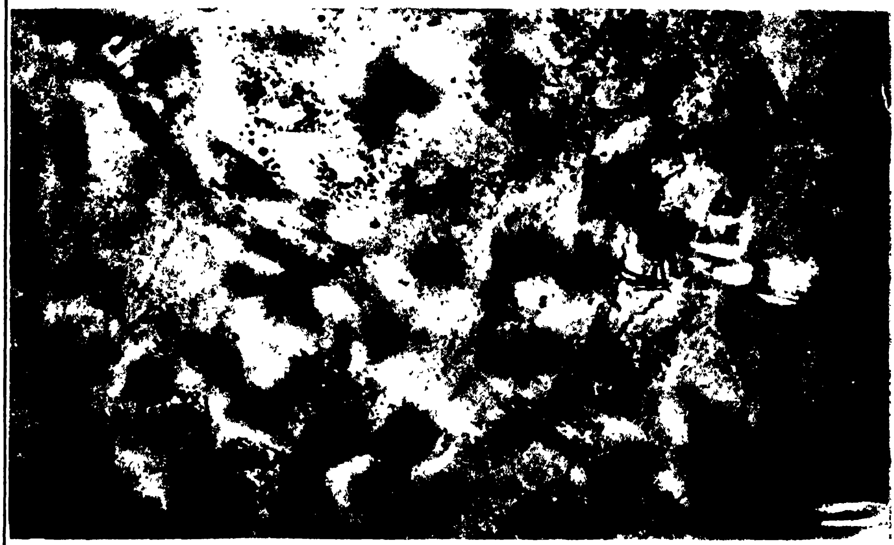

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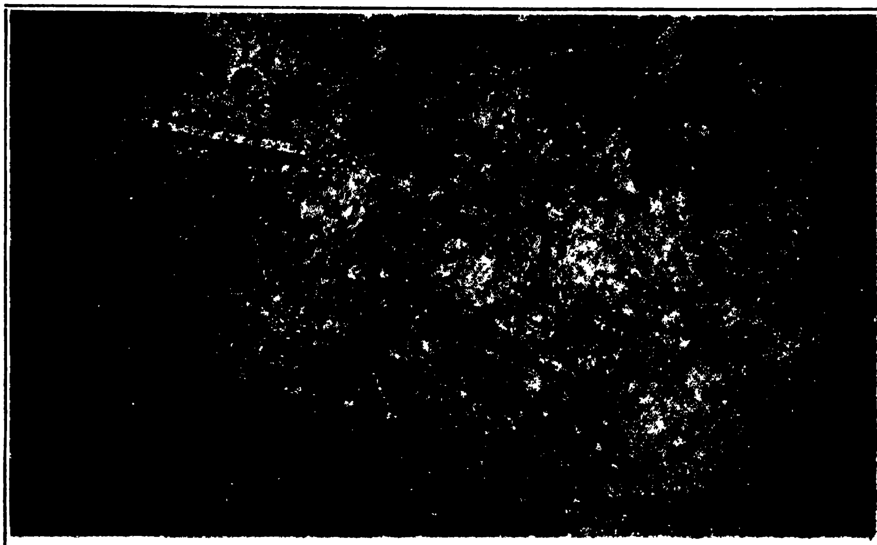

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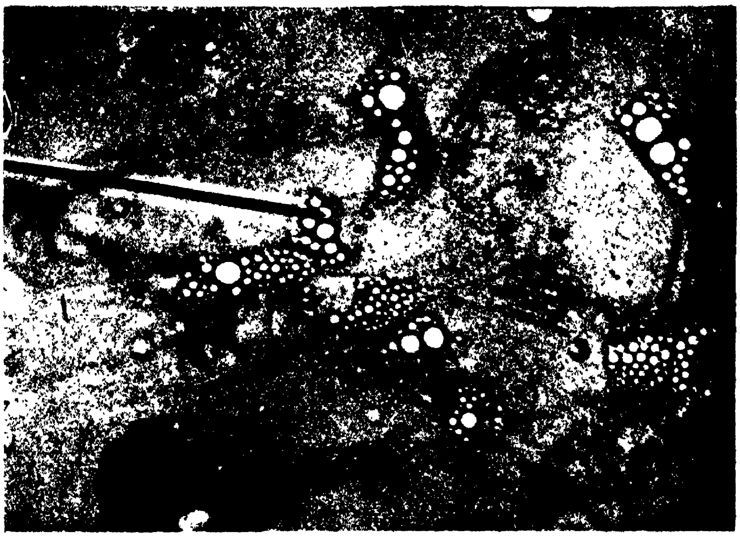

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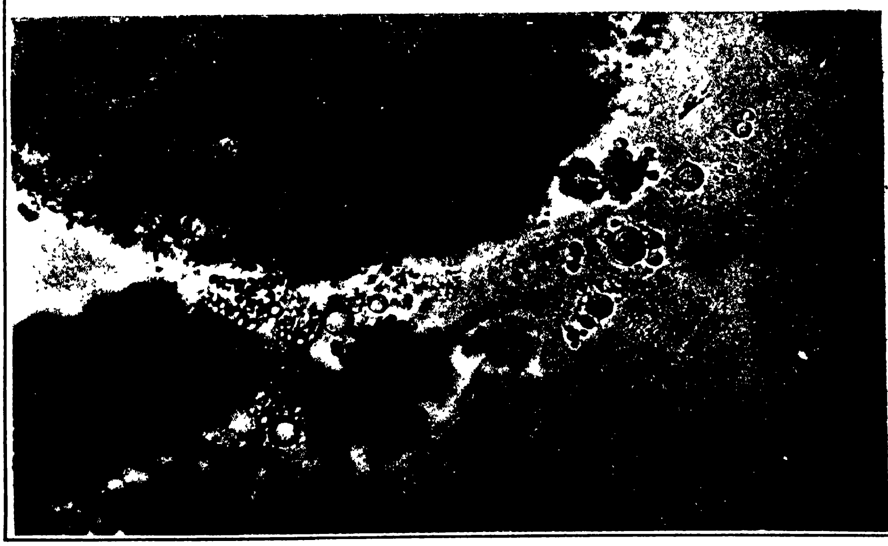

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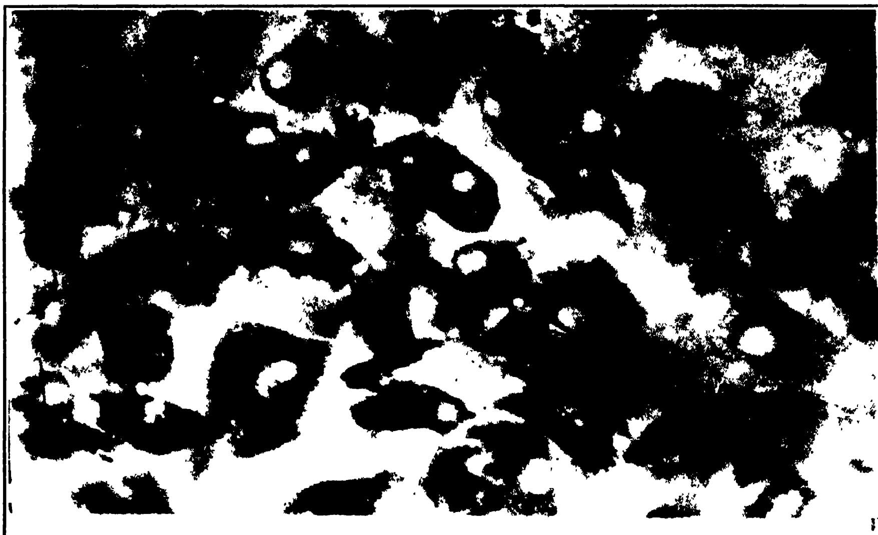

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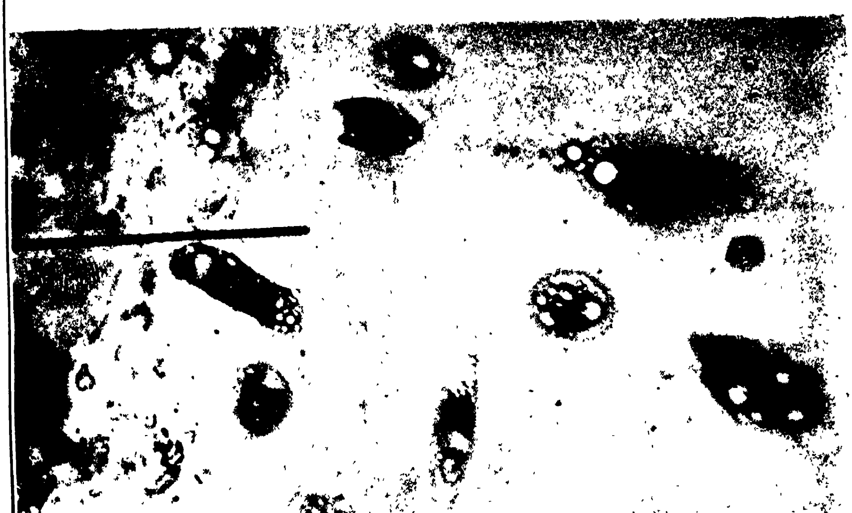

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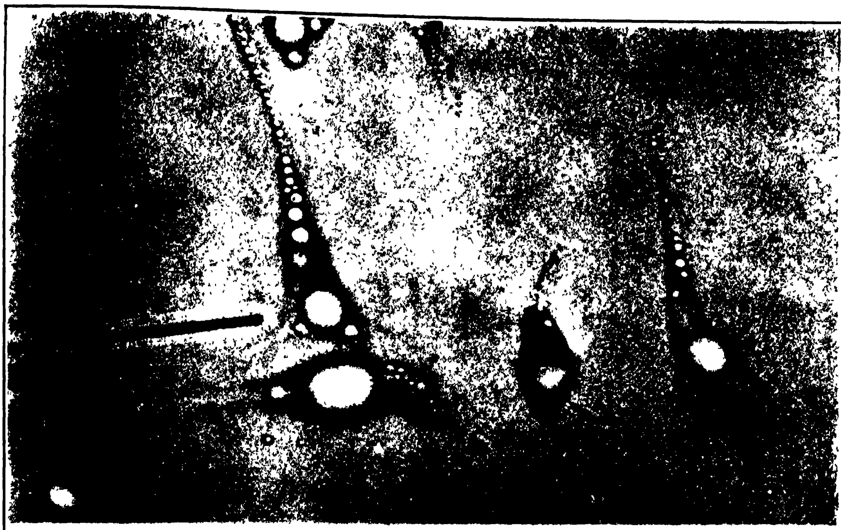

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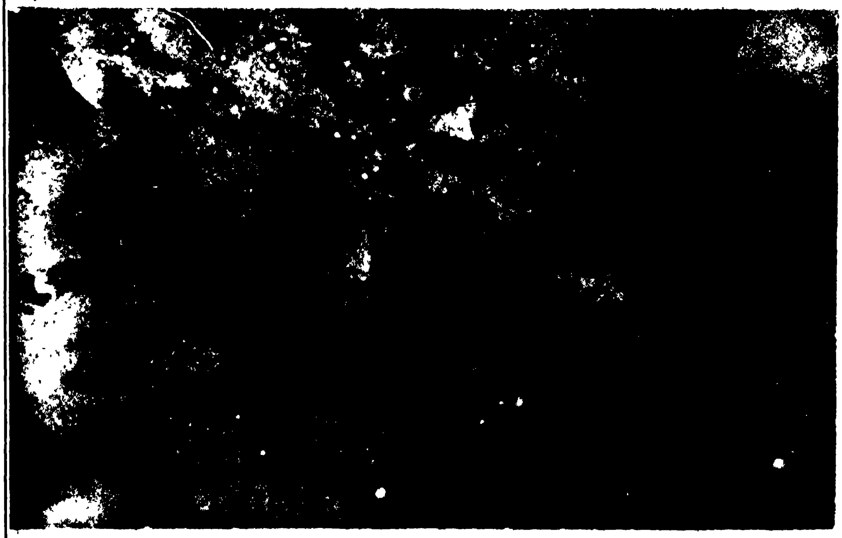

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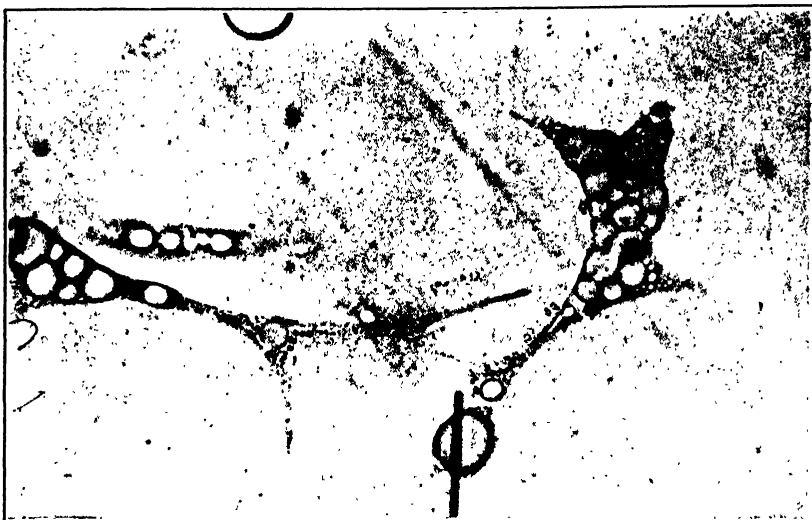

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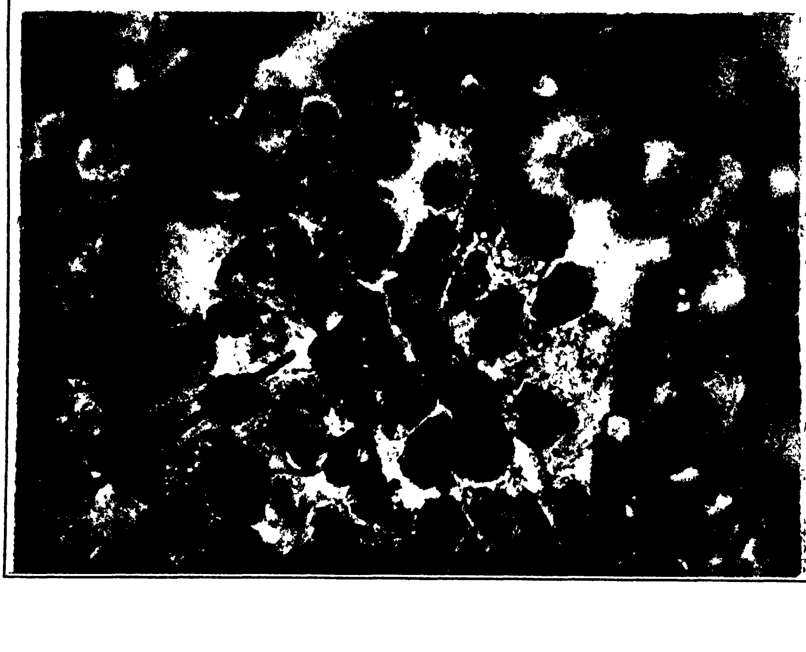

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situated approximately midway between the region of the explant and the periphery of the culture. These cells showed no trace of coagulation and were still expanded and relatively normal. The cells contained much less neutral red absorbing material than was present in the cells at 68 hours (fig. 2), and contained practically no lipoid droplets.

Fig. 6.—Culture from explant of size 1; 166 hours after explantation. This is the same culture as is shown in Figures 4 and 5. This figure shows the cells at the periphery of the culture. There was a marked variation in the size of the neutral red absorbing materials in these cells. Some few neutral red absorbing vacuoles were present. There was a much greater volume of lipoid droplets per cell than in the cells of the more central or middle zones of the culture at this time, but even so there was much less than in cells of this same peripheral region examined at a somewhat earlier stage. It seemed that the cells had possibly disposed of some of their lipoid droplets in some way.

PLATE 3

Fig. 7.—Culture from explant of size 2; 166 hours after explantation. This shows an almost solid sheet of cells just peripheral to the region of the explant. The cells were quite different from those shown in the same region of the culture from explant of size 1 at this time. (Fig. 4.) Note the decreased amount of neutral red absorbing materials as compared with the amount in the cells shown in Figure 2, and the almost complete absence of lipoid droplets.

Fig. 8.—Culture from explant of size 2; 166 hours after explantation. This is the same culture as is shown in Figure 7. This figure shows the peripherally situated cells of the culture. There was a marked accumulation of lipoid droplets and in some of the cells there was an almost complete absence of neutral red absorbing granules. The other cells show only very small amounts of neutral red absorbing granules.

Fig. 9.—Culture from explant of size 5; 166 hours after explantation. This culture was from the same set of cultures shown in Figures 4 to 8. All of the cells had long since died and all that remained were small clumps of lipoid droplets and traces of disintegrated cell cytoplasm.

Culture series A-16. Cultures from stock strain of fibroblasts

PLATE 4

Fig. 10.—Culture from explant of size 1; 22 hours after explantation. This shows the cells which were just peripheral to the region of the explant. There were large numbers of very small neutral red granules per cell. There was an almost complete absence of lipoid droplets.

Fig. 11.—Culture from explant of size 1; 22 hours after explantation. This is the same culture as is shown in Figure 10. This figure shows the peripherally situated cells. There were marked irregularities in the size of the neutral red absorbing materials in the cells; there was also an apparent decrease in the number of neutral red granules, with an increase in their average size. There were also present considerable volumes of lipoid droplets within the cells.

Fig. 12.—Culture from explant of size 5; 22 hours after explantation. This figure shows the whole width of the zone of migrated cells. All cells were of the "peripheral" type, as shown in Figure 11, except about four cells very close to the explant. These were more "central" in type in that they showed a very small volume of lipoid droplets.

PLATE 5

Fig. 13.—Culture from explant of size 1; 70 hours after explantation. This figure shows the cells which were just peripheral to the explant. There was markedly less neutral red absorbing materials per cell than was shown by the cells at 22 hours after explantation. (Fig. 10.) There was an almost complete absence of lipoid droplets.

Fig. 14.—Culture from explant of size 1; 70 hours after explantation. This is the same culture as is shown in Figure 13. This figure shows the peripherally situated cells. Note the rather large neutral red absorbing materials and the many large lipoid droplets. There were marked variations between adjacent cells in the amount of neutral red absorbing materials per cell.

Fig. 15.—Culture from explant of size 4; 70 hours after explantation. This figure shows the whole width of the zone of migrated cells. There were marked irregularities in the amount of neutral red absorbing materials per cell. Some

of the cells were rounding up. All cells showed a good deal of lipoid material. All cells were of the "peripheral" type.

PLATE 6

Fig. 16.—Culture from explant of size 5; 70 hours after explantation. The cells were dead and some had partially disintegrated. They all showed a complete absence of neutral red granules. Note also that the cells showed a smaller volume of lipoid droplets than was shown by the cells of Figures 14 and 15. The small amount of lipoid in these cells was apparently due to the cessation of lipoid accumulation at the time of cell death, which was obviously very early.

Fig. 17.—Culture from explant of size 1; 139 hours after explantation. This shows the region of the explant. Even at this time there was a very small volume of lipoid droplets in the cells shown both in this picture and the next, compared with the volume of lipoid droplets shown in the peripheral cells of the same culture. (Fig. 19.) There had been very little, if any, decrease in the amount of neutral red absorbing materials per cell.

Fig. 18.—Culture from explant of size 1; 139 hours after explantation. This is the same culture as is shown in Figure 17. This shows the cells just peripheral to the explant. Note the tremendous decrease in the amount of neutral red absorbing materials per cell, with the result that many cells were almost invisible.

PLATE 7

Fig. 19.—Culture from explant of size 1; 139 hours after explantation. This is the same culture as is shown in Figures 17 and 18. It shows the peripherally situated cells. There were marked irregularities in the amount of neutral red absorbing materials per cell. As may be seen, these materials were almost completely absent from some cells. There was also a great volume of lipoid droplets per cell.

Fig. 20.—Culture from explant of size 1; 238 hours after explantation. This shows the region of the explant. Much of the explant was necrotic, but the remaining living cells showed a markedly greater amount of neutral red absorbing materials than did the cells just peripheral to this area. (Fig. 21.) Note the small volume of lipoid droplets which was present.

Fig. 21.—Culture from explant of size 1; 238 hours after explantation. This is the same culture shown in Figure 20. It shows the cells which lay just peripheral to the explant. Note small amount of neutral red absorbing materials present in the cells. Note also the almost complete absence of lipoid droplets.

PLATE 8

Fig. 22.—Culture from explant of size 1; 238 hours after explantation. This is the same culture shown in Figures 20 and 21. It shows the peripherally situated cells. There were very small amounts of neutral red absorbing materials per cell but there was a tremendous volume of lipoid droplets per cell.

Fig. 23.—This shows a culture of fibroblasts, from explant of size 2, at about 20 hours after explantation. The cells were so crowded that many of them were practically spherical. This picture is presented to show the small volume of the normal spherical fibroblast compared with the tremendous volume of lipoid droplets which the cells situated in the peripheral zone of these cultures later accumulate. Compare Figures 22 and 23.

During this period of time cultures from explants of size 5, as well as many of those from size 4, showed a general degeneration indistinguishable from that seen in the peripheral cells noted as dying or dead in the cultures from the larger sizes of explants. The accumulation of lipoid material in these cells from explants of sizes 5 and 4 was markedly more rapid than in the peripheral cells from larger sizes of explants. Besides this, often beginning as early as 24 hours after explantation, the cells showed marked signs of lateral retraction (Fig. 12, Pl. 4) and generally within the next 24 to 48 hours the cells rounded up, becoming almost spherical (Figs. 15, 16, Pls. 5 and 6).

During this time the cytoplasm of the cell, in some instances, assumed a "moth-eaten" appearance, due to the formation of large irregular vacuoles of refractive index very slightly lower than that of the cytoplasm. These vacuoles showed no trace of color with neutral red, although the cell granules stained brilliantly. About the same time that this rounding up occurred, sometimes later, these granules lost their affinity for neutral red and the cell was left achromatic and apparently dead. That this death was not simulated was evidenced by the onset of complete disintegration; and within a day or so frequently nothing of the migrated cells remained except a few clumped lipoid droplets. (Fig. 9, Pl. 3.)

This degenerative process was in some instances completed in less than 56 hours from the time the cultures were planted. It generally required less than 90 hours, but in one or two cultures, in which the explant was probably a little larger than usual, it required as long as 114 hours. Even in these slides, however, this degeneration was in strong contrast to the living and relatively normal appearance of the cells from the three or four larger sizes of explants.

In these cultures from sizes 5 and 4 explants of fresh heart, no signs of survival of any muscle tissue was noted after death of the fibroblasts. The explant, following the death of the migrated fibroblasts, appeared completely necrotic.

Several cultures which were planted from explants too small to show any migration at all (size 6 explants) were examined. These all showed death of the whole explant within about 72 hours.

Time 90 hours.—At the end of about 90 hours a rather abrupt change was noted in the neutral red absorbing granules of cells which had migrated out from the larger sizes of explants. At this time there was a great decrease in the number of visible granules per cell. Instead of showing 150 to 300 granules, as they had at about 50 hours, they now showed, in some instances, as few as 25. Further, the size of these granules was markedly decreased; most of them were smaller than 0.8μ in diameter. Besides these discrete granules, traces of very fine neutral red absorbing "dust" became visible scattered through the cell. (Compare Figs. 10, 13, 18, Pls. 4, 5, and 6.)

This change in the neutral red absorbing materials within the cell generally showed up first with the cultures from the largest size explants, at about 90 hours after explantation. In the cultures from the smaller sizes of explant the time of its appearance was generally somewhat retarded; for example, cultures from explants of size 2 sometimes showed this change at 90 hours, sometimes at about 114 hours, while in cultures from explants of sizes 3 and 4 it was sometimes even longer delayed, and when it did appear was much less marked. Further, this change in the neutral red absorbing material was shown most strikingly by the more centrally situated cells lying outside the region

of the original explant. In the case of cells lying through the region of the original explant itself this change was often markedly retarded and was irregular.

At the time of these changes in the amount of neutral red granules the more centrally situated cells, particularly for the three larger sizes of explants, showed very slight traces of lipoid while the peripheral cells, as noted, showed a great deal.

Time 90 to 130 hours.—During the period from 90 to 130 hours the amount of neutral red absorbing materials, in the cells in the living cultures (from explants of sizes 1, 2, 3, and some of 4), though it showed some minor fluctuations from cell to cell, continued to decrease slightly. In the peripheral cells in particular there were all manner of slight variations in neutral red granule content (Fig. 19, Pl. 6), but in general those cells which showed the most dense crowding of lipoid droplets showed a decrease in the number and size of their neutral red absorbing granules. Very few large vacuoles were seen.

At the periphery of the cultures from explants of sizes 1, 2, and 3 at this time cells were occasionally seen rounding up and some few appeared to be dying.

The volume of lipoid droplets increased in the cells of all living cultures. The amounts in the peripheral cells increased at a very rapid rate, while the increase for the more centrally situated cells was very slight and in the case of cultures from the larger sizes of explants, practically zero. As formerly, there was a somewhat greater volume of lipoid droplets in the cells from the smaller sizes of explants. Further, the smaller the explant the more closely did the volume of lipoid droplets in the cells nearer the explant approach the volume in the most peripheral cells. Accumulation of lipoid by the cells of size 5 explants and most of size 4 explants had ceased, since the cells, as stated, were dead.

The region corresponding to the original explant, at about this time, began to show more or less extended patches of necrosis, and its remaining living cells showed a marked tendency to accumulate lipoid. In this tendency there was less regularity in the volume of lipoid droplets per cell than was shown by the cells lying just peripheral to the explant, but the cells of this explant region probably contained as much lipoid as those just peripheral, and in some cultures possibly a little more. (Compare Figs. 17, 18, Pl. 6.)

Time 160 to 300 hours.—Cell clumps from explants of sizes 1, 2, and 3, and those of size 4 which had not already died, as described, showed some variation in the time at which the final stages of general degeneration set in, but this period may be roughly fixed at from 160 to 300 hours. The order in which the cultures from the various sized explants degenerated varied from series to series, but, in general, of the cultures from explants of fresh heart, the first ones to show gen-

eral cell death were those from size 1 explants. In the fresh heart the muscle showed large areas of necrosis at about 160 hours and at this same time, in cultures from explants of size 1, ceased to show contractions when the culture was washed with neutral red solution. There was still slight twitching of the muscle cells on washing some of the cultures from the smaller sizes of explants (2, 3) at this time.

During this terminal period two distinct types of degeneration were noted. (Compare Figs. 4, 5, and 6, Pl. 2.) The first of these was the type previously noted in which the more peripherally situated cells, having gradually filled up with lipoid, lost their neutral red absorbing granules and died. This type of degeneration was, as stated, particularly prominent in the more peripherally located cells and became general throughout cultures from the smaller sizes of explants.

During this terminal period there were signs of some decrease in the volume of lipoid contained as droplets in cells of cultures from the larger sizes of explants. Only a small number of slides were examined at this time, however, so this observation must be considered as requiring confirmation.

The second type of degeneration appeared for the first time during this period. It seemed to spread out from the explant itself rather than encroach from the periphery. In it the cells showed no signs of abnormal lipoid accumulation, but instead generally rounded up, often showed marked signs of coagulation, and lost their staining reaction with neutral red. This degeneration generally appeared in cultures from the largest size of explants and was particularly striking in the cultures from size 1 explants from fresh heart. In these cultures the peripheral cells showed the "lipoid" type of degeneration, the centrally situated cells showed the "coagulation" type, while in between these two zones there was left a zone of almost normal fibroblasts. These types of degeneration, however, were not always so clearly marked into zones and often the slides showed a diffuse overlapping of the two general types.

DISCUSSION

As may be noted from the technique described, an attempt was made to study the cultures used under conditions as uniform as possible. With the explants from fresh heart, for example, explants of any one set of graded sizes were all taken from the same original small tissue fragment, while all explants for any one series of cultures, made up of a number of such sets, were taken from the same heart. To maintain a similar uniformity with the explants of the stock fibroblasts, attempts were made to cut explants as segments of a circle and so minimize variations in cell density from center to periphery. This was practical with all except the smallest sizes of

explants, and these were cut from a region of the culture which seemed to show an average cell density. The region generally used was that lying about midway between the periphery of the original explant and the periphery of the culture.

As will be noted, too, care was taken to maintain a relatively constant culture medium for all cultures examined. The same amounts of culture medium were used for all cultures, and the clots of medium were made comparable in size and shape in order to insure comparable conditions of diffusion and gaseous exchange with the overlying air space. Care was also taken to transfer the explant to the culture medium with as little adherent medium as possible. Further, attempts were made, with the cultures from the stock fibroblasts at least, to insure that all sizes of explants were washed to the same extent. Other precautions noted in the technique require no special explanation.

It is obvious that even with such a technique there were several possible sources of variation in different cultures. Particularly prominent were variation of cell density and of explant size. That these and possibly other factors did introduce marked variations in the growth is shown, for instance, by the fact that of the cultures from size 3 explants some showed growth similar to those of size 2, a few similar to those of size 4. Even with these variations, however, the results from the various phases of the problem and from the different types of cultures studied have been, in general, in agreement.

Considering the general method employed in plotting the curves presented showing the changes in areas of the cultures under discussion, an attempt was first made to present curves which showed the average rates of growth of the cultures from the separate sizes of explants. The general shapes of the curves were similar to those presented in Figures 1 and 2. However, inasmuch as various cultures were sacrificed at different points along the curves out toward the ends of the curves where the points were fewer, when a culture larger than the average was sacrificed, the average of the next series of observations showed a sharp drop. This drop was obviously not due to any change in the cultures themselves, but was due to the method of plotting these data. An attempt was then made to present the modes of the various sizes, determined by inspection. This method of plotting was found to give much smoother curves with these data, particularly in the terminal portions of the curves, and to produce curves which were representative of the trend for the curves for the separate cultures examined.

Both of the sets of curves presented to show changes in the areas of the cultures show several points, belonging to cultures from the two largest sizes of explants, lying much above the mode lines for these sizes. It may be noted that these points were from explants

which, through variations in technique, were probably somewhat larger or denser than those usually employed. However, although the cultures represented by these points showed unusually large areas, the changes observed in the slope of their curves, the relation of the cultures to each other, and the changes in the cells themselves coincided with those seen for the other cultures grouped as the same sizes.

The similarity between the general shapes of the curves for the changes of area for cultures from explants of fresh heart and of stock fibroblasts is obvious. As will be noted, the maximum rise for the curve representing the area of the largest size explant coincides almost exactly in both types of cultures, as does the rate of rise and the region at which the curve flattens out. The general trend of the curves for the smaller sizes of the two types of cultures is also similar, differences being easily accounted for by variations in the sizes of the explants used, and differences in their cell densities.

This similarity in the curves for the changes of areas of the cultures from explants from fresh hearts and stock fibroblasts, as well as the evident similarity of the cell changes seen in the two types of cultures, appear to indicate that the factors conditioning the life of the cells in the two types of cultures are essentially similar, at least through the first 100 hours or so after explantation. The later necrosis of the muscle cells of the cultures of fresh heart, accompanied by a central "coagulation" type of degeneration of the fibroblasts in the cultures from the largest size of explants, shows that the two types of cultures, in these later stages, are less comparable. In general though, inasmuch as our chief interest is in the period before this necrosis of muscle sets in, we feel warranted in considering the two types of cultures together.

For both types of cultures the absolute increase of area of the cultures with the passage of time varied directly as the size of the explant. Further, for nearly all of the cultures examined, the maximum size attained by the culture, under the conditions of the experiment, also varied directly with the size of the explant. The only exceptions to this were a few cultures from explants of sizes 3 and 4, and these variations probably arose from errors in technique.

If we assume that the total metabolic changes produced in the surrounding medium by any one culture for any given period of time was a product of the number of cells in the culture, and the time, the area included under any one of these curves from time T_0 to T_1 will represent, roughly at least, the total metabolic change produced by the culture from that size of explant from time T_0 to T_1. Choosing T_1 arbitrarily as 140 hours, it appears that within the time from 0 to 140 hours, although cultures from both sizes of explants had approximately reached their respective maximal areas, cultures from size 5

explants of stock fibroblasts had produced a total metabolic change of only 9 per cent of that produced by the cultures from explants of size 1. For the cultures from the explants of fresh heart this difference is even more striking. Inasmuch as the cell density in cultures from explants of size 5 was generally markedly less than that in cultures from explants of size 1, these contrasts are even more striking than are indicated by the above figures.

Even from this consideration of the relative growth curves it appears obvious that, in addition to the limits imposed on all cultures by the necessity of maintaining their existence from a measured and constant quantity of nutrient material, there was some other definite limiting factor exerting an action on the increase in the area of the culture. This factor appeared to be independent of the total food supply. It seems that we may also conclude from these curves that the action of this factor varied inversely as the size of the culture explant and was most profound in its influence on cultures from the smallest size of explant.

Considering the occurrence of cell degeneration and death in these cultures, the early death of the cultures from the smallest sizes of explants confirms the work both of Burrows and of Fischer in showing that such cell clumps do not proliferate normally. Further, it confirms the work of Fischer in showing that this process of death is not merely due to some process of exhaustion of the medium, such as is seen in the case of the larger sized explants, but is apparently due to the very active influence of some factor which, with the larger size explants, was either nonexistent or was of minor influence.

It is also of interest that during the period from 20 to 140 hours after transplantation, as will be discussed later, some marked signs of degenerative changes were noted in the more peripheral cells of the larger size explants, although in relatively few cases were these changes observed to be so extreme as to lead to cell death.

An attempt was made to study the final type of death in the larger sized explants, but inasmuch as few slides were examined and as the processes observed were not clear, little can be said. It is of interest to note though, that in the largest size of explants from the fresh heart two definite lethal processes were observed, the one encroaching from the periphery, and representing what was apparently a continuation of the tendency for peripheral degeneration; the other radiating from the explant and probably representing a necrosis arising from local lack of food materials or from accumulation of toxic products. This last process was also noted by Burrows (2). That it showed up markedly only in the cultures from fresh heart may have several explanations. For example, it may represent a necrosis of fibroblasts resulting from toxic products resulting from the death of the muscle cells present. On the other hand, it may only mean that the cultures

of stock fibroblasts were less dense and so allowed a better distribution of food and diffusion of waste materials through this central region.

Considering the changes in the neutral red granules of the cells from the time of explantation on, during the first 70 hours there was a marked increase in the number of neutral red granules within the cells from the fresh chick heart, and a very slight, if any, increase in those from the stock fibroblasts, which had been grown for many generations in plasma and embryo juice. This increase in the number of granules per cell probably represented an adaptation from the culture media in which the tissue had formerly lived to that to which it was transferred. The sharp decrease in the number and size of the neutral red granules in the largest size cell clump at about 90 hours however and the same decrease, generally in retarded and less striking form, in the explants of sizes 2, 3, and 4, appeared to result from the exhaustion of the food supply of the culture or to accumulation of waste products. This interpretation is indicated by the fact that the decrease appeared first and most markedly in cultures from the largest sizes of explants and appeared later and in less striking form in cultures from explants of sizes 2, 3, and 4. It is also indicated by the fact that this decrease coincided approximately in time with the decrease in the rate of increase of size of the culture, and by the observation of Carrel and Ebeling (3) that a decreased number of such granules is associated with a low rate of culture growth.

Of the later fluctuations in the neutral red absorbing materials, little can be said except that they were almost certainly associated with the degenerative changes which resulted in the general death of the culture.

Except for the peripheral irregularity, which was more pronounced in cultures from the explants of smaller size, and the variation in the time of decrease of the neutral red absorbing materials at about 90 hours, there appeared little difference in the occurrence and distribution of neutral red through cultures from the various sizes of explants.

That the accumulation of lipoid droplets within the cells of these cultures, as described, represented a true increase in the lipoid within the cell, and not just an unmasking of lipoid, already present, by some degenerative cleavage of the cell cytoplasm, is obvious from many of the slides examined. In these slides the total volume of lipoid present within the cell was several times greater than the original total normal cell volume. For example, the normal cells of one typical culture were estimated as having a volume of approximately 150 volume units each, while at a later stage of degeneration cells were seen in the same series of cultures which showed approximately 500 volume units of lipoid droplets contained within each cell. A similar contrast may be observed by comparing the volume of each of the more spherical cells of Figure 23 with the total volume of the lipoid droplets

seen in each cell of Figure 22, Pl. 8. These results agree with those of Lambert (8, 9), of Lewis (10), of Baker and Carrel (1) and of Hewell and Donley (7), who found that fibroblasts were able to take up and to store certain lipoids as droplets within the cell.

At the time of explantation, the fibroblasts from the fresh chick heart contained practically no lipoid droplets, while the fibroblasts from the stock strain of cells contained some small volume of such droplets. For the first 70 hours after explantation there appeared to be little increase in the total volume of lipoid droplets in the cells just peripheral to the region of the explant in the cultures from explants of sizes 1, 2, and 3 of fresh heart, while in such cultures from stock fibroblast explants there was some slight decrease in the total volume of lipoid droplets per cell. The result of this change was that at about 70 hours after explantation the cells of this more central region, for both types of cultures, contained only a very small total volume of lipoid droplets. Practically no increase was noted in this volume up to about 100 to 150 hours. From this time on there was a gradual increase in the amount of such lipoid material in each cell. This increase was very slow for cells of the more central region noted, for cultures from the largest size of explant, but appeared sooner and was much more rapid in cultures from explants of smaller and smaller sizes.

With the peripherally situated cells of these same cultures, however, for both types of cultures a strikingly rapid increase in the volume of lipoid droplets per cell was noticeable, even as early as 20 hours after explantation. Further, in these peripherally situated cells, the rate of accumulation of lipoid droplets, as in the more centrally situated cells, became greater in the cultures from smaller and smaller explants.

The results of these changes were that for cultures from a graded series of sizes of explants, at any one time, the cells of the cultures from the smaller sizes of explants contained a greater volume of lipoid droplets than did the comparably situated cells from the larger sizes of explants. This difference was particularly prominent for the most peripherally situated cells and for the more centrally situated cells of cultures from the smallest sizes of explants. Further, in the cells of any one culture at any one time there was a definite gradient of lipoid deposition. This gradient extended from the cells just surrounding the explant, which cells showed little or no lipoid, to those most peripherally situated, which showed much lipoid. And finally, with the smaller explants this gradient became less prominent due to the increased similarity of the central to the peripheral cells, until, with the cultures from explants of size 5, it did not exist. With cultures from this size explant the central and the peripheral cells were identical; both were "peripheral" in type.

As the work of Baker and Carrel (1) has shown, an excessive amount of lipoid material in the culture medium results in a marked retardation in the rate of increase of area of cultures of fibroblasts planted therein. Baker and Carrel further note that the cells of such a culture became "fatty and the tissue died after a short time, the lipoid acting as a toxic substance."

It appeared that the most peripheral cells of the cultures examined from any of the sizes of explants used were under conditions which vary greatly from the optimal. This was indicated by the irregularities seen in the neutral red absorbing materials, the occasional occurrence of cell death, and the constant general and excessive accumulation of lipoid materials by the cells of this peripheral region. What influence it was that resulted in this variation from optimal conditions in this peripheral region, and so produced such excessive lipoid accumulation, our data do not indicate. It is possible that this factor was the presence of an abnormal amount of lipoid in the culture medium. It is also possible that the factor was something else, the influence of which inhibited the oxidative processes of the cells of this region without similarly inhibiting their absorptive processes. As is obvious, this might easily have resulted in accumulation of lipoid droplets within the cell and might possibly have produced the other changes noted as well. Or it is also possible that the factor was some combination of the two above factors. Whatever the responsible factor may have been, the question is raised as to whether or not it was its influence which was chiefly or solely responsible for the observed fact, previously noted, that the maximal size of any culture, under the conditions of the experiment, varied directly as the size of the explant, and secondly, that cultures from the smallest of these explants died abnormally early.

Considering the first of these points, in the most peripheral cells of cultures from the largest size of explant, there was a somewhat slower accumulation of lipoid per cell than for similarly situated cells in cultures from smaller sizes of explants. Further, it will be noted that in cultures from explants of the largest size, the peripheral zone of lipoid accumulating cells occupied the smallest fraction of the diameter of the culture, and, hence, the smallest fraction of the area of the culture. From these data and from the demonstration by Baker and Carrel that lipoids are definitely inhibitory for the increase of area of cultures of fibroblasts, it appears that in the action of the factor which is responsible for the accumulation of lipoid within these cells we have at least one influence which would tend to make the maximal size attained by any culture, under the conditions of the experiment, vary directly as the size of the explant. Whether this factor was the prime one responsible for this variation our data do not at present permit us to say.

Our data are not sufficient to allow us to draw a final conclusion as to whether or not it is this factor which was responsible for lipoid accumulation within the cell, which was also responsible for the early death of cultures planted from explants of sizes 4, 5, and 6. It appears definite that the cultures from the smallest sizes of explants 4, 5, and 6 did not die as the result of the action of a final total volume of lipoid droplets having been collected within the cells. This is indicated by the observation that at the time of death these cells showed only about 50 volume units of lipoid droplets per cell, while cells have been observed in a living condition in the peripheral zone of larger size cultures at a later time which contained nearly 500 volume units of lipoid each. On the other hand, until they rounded up and died, the cells from explants of sizes 4, 5, and 6 showed the most rapid rate of lipoid accumulation of any cells. It is conceivable that this excessive rate of accumulation of lipoid within the cell may have resulted from some process of cell injury so severe as to result in cell death. On the other hand, it is quite possible that the factor responsible for this accumulation of lipoid within the cell might play a negligibly small rôle in the causation of cell death in cultures from these small size explants.

SUMMARY

1. An attempt was made to study the influence of the size of the explant upon cultures of fibroblasts of the chick, planted in a small and thin hanging drop of embryo juice and plasma. This medium was not changed during the life of the culture. The range of sizes of explants used varied from only a few cells up to cell clumps of about 1 mm. cube. Fibroblasts from both fresh chick heart and a stock strain were used.

2. It was found that for the cultures studied, the absolute increase in the area of a culture varied approximately directly as the size of the explant.

3. Further, the final maximal size of a culture also varied approximately directly as the size of the explant, and in cultures from the smallest sizes of explants it was very slight indeed.

4. Curves representing the areas of the cultures from different sizes of explants, as a function of time, showed a similar shape for the three or four largest sizes of explants. Following a short latent period there was a sharp increase in the areas of the cultures, this continuing until about 90 hours after explantation, at which time the rate of increase decreased rapidly and the curve flattened out.

5. It was found that this decrease in rate of change of area occurred almost simultaneously with a sharp decrease in the number of neutral red granules within the cells. It is concluded that these changes were due to exhaustion of the surrounding medium.

6. With these large size cultures general cell death did not set in until after about 160 hours.

7. With cultures from the smallest sizes of explants, however, following a slight initial migration, lasting about 50 hours, general cell death occurred, with the result that practically all of these cell clumps were dead by 90 hours after explantation.

8. It is shown that this cell death in cultures from the smallest sizes of explants was not due to exhaustion of the surrounding medium, but was due to the influence of some other factor.

9. During the life of the various cultures it was found that the cells of all cultures accumulated lipoid droplets within them. For the first hundred hours and longer, after explantation, the cells just surrounding the region of the explant, in the cultures from the largest size of explants, showed exceedingly slight accumulation; the most peripheral cells of the same culture showed a tremendous accumulation of such lipoid droplets.

10. This gradient of lipoid distribution appeared in all of the larger sizes of cultures, but became less prominent in the cultures from the smaller sizes of explants due to the fact that the more central migrated cells in these cultures appeared increasingly like the most peripheral cells. With cultures from the smallest size of explant this gradient did not exist; both centrally and peripherally situated migrated cells appeared of the "peripheral" type.

11. The conclusion is reached that this accumulation of lipoid droplets within the cell was not due to an "unmasking" of lipoids already within the cell, but was due to the absorption of lipoid more rapidly than the cell could dispose of it.

12. The conclusion is also reached that this accumulation of lipoid droplets within the cells lying in the most peripheral zone of the culture probably resulted from the action of a factor which was at least partly responsible for the fact observed that the maximal size of a culture varied approximately directly as the size of its explant.

13. The question is raised as to whether the extremely rapid accumulation of lipoid droplets by cells from the explants of the smallest size might not be intimately associated with the observed fact that these cells died much earlier than did those from explants of larger sizes.

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COURT DECISION RELATING TO PUBLIC HEALTH

Ordinance imposing fee for inspection of certain bakery products held void.—(Arkansas Supreme Court; Phillips *v.* City of Siloam Springs, 30 S. W. (2d) 220; decided July 14, 1930.) An ordinance of the city of Siloam Springs required that persons or corporations not having an established place of business in the city and bringing bakery products regularly into the city for sale should submit the wagon, automobile, or other vehicle and the bakery products transported therein for inspection at least once a week. A charge of $2 was made for each certificate of inspection.

The appellant, who had been convicted in the lower courts of violating this ordinance, was a salesman of a baking company in Fayetteville. The said company manufactured its products under the supervision and rules of the State board of health, the county health officer, and the city board of health. The city of Siloam Springs had not been given the power to require the inspection of bakeries or the regulation of the sale of their products. The supreme court reversed the judgment of the lower court and dismissed the cause, holding that the ordinance in question was void. A part of the court's opinion follows:

* * * The ordinance complained of only attempts to levy a charge for inspection of breads, cakes, and pies transported over the streets of the city for sale in vehicles, wagons, or automobiles, and does not prevent the shipping of such products by train, nor does it require an inspection thereof. The products were carried in a closed truck or automobile from the place of their manufacture under the rules and supervision of the State and city boards of health in the city of the location of the manufacturing plant, wrapped and sealed as required by the regulations of such boards. There could certainly be no further protection to the health of the inhabitants of the city of Siloam Springs, where the bread and cakes were delivered to the purchasers for resale to the public, by another inspection by the city under the provisions of this ordinance, and, if such were the case, there could be no reason for discrimination against the seller of these products so transported, requiring this second inspection thereof, which

is not required of the same kind of products transported and delivered by railroad carriers. Neither is there any good reason for requiring a weekly inspection of the car or vehicle and the products transported which are allowed to be sold and delivered daily. Such provision clearly indicates that it is an arbitrary one and that necessity does not really exist for the inspection prescribed, since it is required of only one delivery out of seven, and brands it rather as an unrecognized method for raising revenue, since the inspection charges would amount to $104 per year at the very least, and appears to be imposed rather as a discrimination against merchants and bakers not living in the city.

Power has been given to the State board of health for making all necessary rules and regulations for the protection of the peoples of the counties and cities, the regulations have been made by such boards, and appellant's employer, having manufactured and sealed its products under the inspection and in accordance with the rules and regulations prescribed by the State and city boards of health in the city of the manufacture of its products, could not be required to pay for the inspection for the sale of its products so manufactured in other towns and cities of the State, in the absence of a showing of the necessity therefor and power in such city to prescribe such regulation and require such inspection. All necessary power having been given to the State board of health for the regulation and operation of bakeries in the manufacture and sealing of their products for sale and delivery, any power upon the part of cities and towns of the State to regulate the sale of such products in their limits upon an inspection made and charged for will not be implied as incident to the power granted, and, since none have been expressly granted, they can not be held to exist. The city was without power to make such ordinance and charge, and it is void and of no effect.

DEATHS DURING WEEK ENDED OCTOBER 11, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended October 11, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Oct. 11, 1930	Corresponding week, 1929
Policies in force	75, 406, 109	74, 892, 526
Number of death claims	11, 836	11, 494
Death claims per 1,000 policies in force, annual rate	8. 2	8. 0

Deaths[1] *from all causes in certain large cities of the United States during the week ended October 11, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Oct. 11, 1930				Corresponding week, 1929		Death rate[2] for first 41 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1930	1929
Total (77 cities)	7,242	11.0	750	[4] 61	11.1	669	12.0	12.8
Akron	42	8.6	5	46	8.5	6	8.0	9.4
Albany[5]	37	15.1	3	62	16.1	5	14.9	16.5
Atlanta	86	16.7	16	164	16.7	9	16.0	16.2
White	44		9	143		7		
Colored	42	(6)	7	201	(6)	2	(6)	(6)
Baltimore[5]	201	13.0	25	87	12.6	18	14.0	14.8
White	155		18	80		11		
Colored	46	(6)	7	112	(6)	7	(6)	(6)
Birmingham	50	10.0	5	48	11.6	12	13.8	16.2
White	21		1	16		3		
Colored	26	(6)	4	98	(6)	9	(6)	(6)
Boston	219	14.6	32	93	14.2	23	14.1	15.2
Bridgeport	30	10.6	2	34	13.8	8	11.0	12.3
Buffalo	144	13.1	21	94	10.7	9	13.1	14.1
Cambridge	30	13.8	4	80	9.2	0	11.9	12.5
Camden	20	8.9	2	35	11.1	2	13.7	14.5
Canton	22	10.8	3	80	3.0	1	10.0	11.3
Chicago[5]	670	10.3	68	60	9.7	45	10.5	11.4
Cincinnati	130	15.0	17	100	14.9	8	15.7	17.2
Cleveland	158	9.1	13	39	11.5	7	11.1	12.6
Columbus	99	17.8	13	128	12.9	6	15.8	15.0
Dallas	35	7.0	4		8.4	2	11.4	11.6
White	22		3			2		
Colored	13	(6)	1		(6)	0	(6)	(6)
Dayton	49	12.7	10	149	10.1	5	10.7	11.6
Denver	94	17.0	10	109	15.2	4	14.9	14.9
Des Moines	24	8.8	1	18	9.6	3	11.7	11.8
Detroit	250	8.2	42	65	9.2	48	9.4	11.3
Duluth	23	11.8	2	54	9.8	1	11.3	11.7
El Paso	21	10.7	5		19.2	7	17.5	20.0
Erie	25	11.2	2	44	10.4	3	11.3	12.5
Fall River[5,7]	20	9.1	2	46	11.8	2	12.0	13.9
Flint	19	6.3	6	71	13.0	10	9.2	10.9
Fort Worth	24	7.7	2		6.9	2	11.2	12.5
White	16		1			2		
Colored	8	(6)	1		(6)	0	(6)	(6)
Grand Rapids	29	9.0	3	45	10.0	2	10.3	10.2
Houston	58	10.3	7		9.8	4	12.3	12.8
White	37		5			2		
Colored	21	(6)	2		(6)	2	(6)	(6)
Indianapolis	118	16.8	8	60	13.0	10	14.8	14.8
White	98		6	52		8		
Colored	20	(6)	2	117	(6)	2	(6)	(6)
Jersey City	62	10.2	9	78	9.6	3	11.3	12.6
Kansas City, Kans.	35	14.9	1	23	9.4	3	11.7	13.3
White	24		1	28		3		
Colored	11	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo.	99	13.1	9	75	10.5	4	13.5	14.0
Knoxville	21	10.3	2	47	21.1	6	13.6	14.1
White	20		2	52		6		
Colored	1	(6)	0	0	(6)	0	(6)	(6)
Los Angeles	282	11.8	21	63	12.1	19	11.1	11.4
Louisville	79	13.4	8	69	11.0	9	13.6	15.0
White	59		7	69		8		
Colored	20	(6)	1	66	(6)	1	(6)	(6)
Lowell[7]	24	12.5	3	79	10.8	6	13.4	14.2
Lynn	23	11.7	1	28	6.1	0	10.5	11.4
Memphis	55	11.3	7	82	17.9	10	17.1	19.3
White	29		4	72		7		
Colored	26	(6)	3	101	(6)	3	(6)	(6)
Milwaukee	100	9.1	6	26	10.4	19	9.8	11.1
Minneapolis	88	9.9	3	20	8.9	7	10.7	10.9

See footnotes at end of table

Deaths[1] *from all causes in certain large cities of the United States during the week ended October 11, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*—Continued.

City	Week ended Oct. 11, 1930				Corresponding week, 1929		Death rate [2] for first 41 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Nashville	42	14.9	9	141	14.2	12	17.4	18.9
White	23		7	147		9		
Colored	19	(6)	2	124	(6)	3	(6)	(6)
New Bedford [7]	19	8.8	2	51	8.7	2	10.9	12.4
New Haven	45	14.4	4	62	12.5	4	12.8	13.4
New Orleans	134	15.3	15	83	16.1	12	17.5	17.7
White	80		7	59		7		
Colored	54	(6)	8	130	(6)	5	(6)	(6)
New York	1,252	9.3	106	45	9.9	111	10.8	11.4
Bronx Borough	157	6.4	11	32	7.4	15	7.9	8.3
Brooklyn Borough	406	8.1	38	40	8.8	39	9.7	10.3
Manhattan Borough	523	14.7	40	51	14.6	43	16.1	16.6
Queens Borough	124	5.9	11	44	6.3	11	7.1	7.7
Richmond Borough	42	13.8	6	117	12.8	3	14.5	16.0
Newark, N. J	93	10.9	11	58	9.9	10	12.0	12.9
Oakland	50	9.1	2	25	10.3	2	11.0	11.5
Oklahoma City	34	9.6	6	108	9.8	4	10.9	10.8
Omaha	42	10.2	4	49	12.3	7	13.6	13.7
Paterson	29	10.9	2	35	9.8	1	12.3	13.4
Philadelphia	419	11.1	49	73	11.3	31	12.6	13.2
Pittsburgh	166	12.9	21	74	11.9	20	13.8	14.9
Portland, Oreg	72	12.5	2	25	9.9	3	12.2	12.8
Providence	41	8.5	2	19	13.8	5	13.1	14.6
Richmond	38	10.8	5	73	12.6	5	14.8	16.4
White	23		1	22		1		
Colored	15	(6)	4	171	(6)	4	(6)	(6)
Rochester	90	14.4	12	107	10.2	8	11.7	12.5
St. Louis	210	13.3	21	73	12.2	6	14.2	14.7
St. Paul	49	9.4	4	40	8.7	1	10.1	10.5
Salt Lake City [5]	31	11.5	2	32	9.8	2	12.2	13.0
San Antonio	49	9.9	5		12.6	5	15.1	14.5
San Diego	34	11.9	1	21	12.7	1	14.4	15.2
San Francisco	115	9.5	6	41	12.3	8	13.2	13.2
Schenectady	13	7.1	2	62	12.0	1	11.3	12.4
Seattle	70	10.0	4	40	12.3	3	10.9	11.2
Somerville	21	10.5	2	63	7.1	1	9.8	9.3
Spokane	25	11.3	2	52	9.1	1	12.3	12.9
Springfield, Mass	36	12.5	5	86	9.5	2	12.2	12.9
Syracuse	51	12.8	7	86	10.2	4	11.7	13.2
Tacoma	14	6.8	2	55	9.8	2	12.3	11.8
Toledo	64	11.4	9	83	11.2	11	12.7	13.7
Trenton	49	20.8	8	154	14.9	7	16.8	17.3
Utica	24	12.2	1	28	16.8	2	14.6	15.6
Washington, D. C	129	13.8	7	41	15.4	12	15.1	15.5
White	76		3	26		3		
Colored	53	(6)	4	71	(6)	9	(6)	(6)
Waterbury	11	5.7	1	24	10.4	3	9.6	9.5
Wilmington, Del.[7]	29	14.4	3	72	10.4	7	14.7	13.9
Worcester	42	11.1	3	42	11.0	4	12.7	12.7
Yonkers	15	5.8	0	0	7.9	1	8.0	9.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 72 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended October 18, 1930, and October 19, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 18, 1930, and October 19, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929
New England States:								
Maine	5	3	2	2	1	17	0	1
New Hampshire	5	1		5		23	0	0
Vermont	1				4	1	0	0
Massachusetts	69	106	2	4	80	77	1	2
Rhode Island	7	7					0	0
Connecticut	16	36	2	4	8	3	0	0
Middle Atlantic States:								
New York	66	158	[1] 6	[1] 22	74	171	11	18
New Jersey	69	100	8	2	32	11	2	3
Pennsylvania	108	155			76	150	2	5
East North Central States:								
Ohio	63	63	22	12	10	114	8	2
Indiana	52	29	10		18	6	7	0
Illinois	110	205	7	15	20	82	4	6
Michigan	68	116	3	2	42	91	8	23
Wisconsin	16	15	5	28	40	194	5	1
West North Central States:								
Minnesota	21	44	1	1	12	21	0	0
Iowa	9	18			2	6	1	1
Missouri	46	74		8	70	11	2	5
North Dakota	7	11				1	0	2
South Dakota	11	2					0	0
Nebraska	14	54	6		19	27	0	1
Kansas	11	36	13		1	64	2	1
South Atlantic States:								
Delaware	2	3				1	0	0
Maryland [2]	29	40	6	10		6	0	1
District of Columbia	7	15			1	1	0	1
Virginia								
West Virginia	15	26	12	11	21	28	1	0
North Carolina	216	299	9	4	5	1	5	1
South Carolina	65	83	320				0	0
Georgia	36	40	46	49	7	2	0	1
Florida	8	22	1	3	2	2	0	0
East South Central States:								
Kentucky	10	20					3	0
Tennessee	35	51	16	21	4	13	2	1
Alabama	70	75	6	7	32	12	3	1
Mississippi	56	103					4	0

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 18, 1930, and October 19, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19 1929
West South Central States:								
Arkansas	7	25	8	21	1	1	0	1
Louisiana	20	38	2	7	3	4	2	3
Oklahoma [2]	57	99	15	38	7	13	1	1
Texas	35	79	8	15	9	1	0	0
Mountain States:								
Montana	2	4			1	114	0	2
Idaho	1				2	10	0	4
Wyoming							0	0
Colorado	6	11			31	4	1	3
New Mexico	12	5			8	1	0	0
Arizona	5	6	2		5		0	3
Utah [1]	1	1	4	4		3	5	1
Pacific States:								
Washington	32	17			6	11	2	1
Oregon	3	15	13	17	99	14	0	1
California	55	68	20	25	123	52	4	9

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19. 1929
New England States:								
Maine	15	1	23	24	0	0	2	2
New Hampshire	1	0	3	15	0	0	0	0
Vermont	0	0	8	2	2	0	1	0
Massachusetts	42	9	82	156	0	0	11	9
Rhode Island	0	0	9	6	0	0	0	0
Connecticut	10	2	15	24	0	0	7	5
Middle Atlantic States:								
New York	50	31	160	129	0	22	45	33
New Jersey	1	2	77	70	0	0	8	8
Pennsylvania	10	11	194	214	0	0	58	44
East North Central States:								
Ohio	96	7	277	153	17	15	63	41
Indiana	16	1	91	82	22	13	12	4
Illinois	19	12	187	336	23	42	40	17
Michigan	15	14	142	183	22	44	22	17
Wisconsin	15	0	89	61	11	1	8	68
West North Central States:								
Minnesota	20	0	38	76	4	7	4	8
Iowa	19	6	27	32	1	8	2	7
Missouri	12	0	57	72	2	6	27	10
North Dakota	1	0	12	21	6	9	6	2
South Dakota	8	0	12	14	10	15	3	8
Nebraska	35	0	29	18	2	7	1	2
Kansas	44	1	42	92	2	20	8	5
South Atlantic States:								
Delaware	0	0	2	4	0	0	20	0
Maryland [1]	4	0	44	51	0	0	38	23
District of Columbia	1	0	8	10	0	0	0	3
Virginia		15						
West Virginia	6	1	34	82	0	5	32	32
North Carolina	0	2	156	140	1	11	26	16
South Carolina	0	1	42	44	0	0	9	27
Georgia	1	1	24	42	0	0	42	12
Florida	1	0	4	5	0	1	1	3
East South Central States:								
Kentucky	5	0	34	15	0	7	10	19
Tennessee	4	2	25	60	5	2	26	30
Alabama	2	2	58	63	0	0	34	12
Mississippi	0	0	24	26	0	1	37	13

[1] Week ended Friday.
[2] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 18, 1930, and October 19, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929	Week ended Oct. 18, 1930	Week ended Oct. 19, 1929
West South Central States:								
Arkansas	2	0	11	19	1	1	21	20
Louisiana	4	0	13	26	1	0	10	12
Oklahoma [2]	6	0	38	46	18	22	41	34
Texas	4	2	21	28	2	0	23	7
Mountain States:								
Montana	1	0	21	18	2	15	8	25
Idaho	1	0	1	12	0	3	3	0
Wyoming	2	0	3	2	1	0	0	6
Colorado	4	0	31	13	3	9	8	5
New Mexico	0	0	12	7	0	2	21	18
Arizona	0	0	4	1	0	0	1	3
Utah [1]	0	0	12	4	1	0	5	5
Pacific States:								
Washington	3	2	48	40	24	42	6	18
Oregon	2	1	13	15	1	14	6	5
California	87	5	58	141	4	17	14	12

[1] Week ended Friday.
[2] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August, 1930										
Hawaii Territory	2	14	12		5		4	4	0	28
September, 1930										
Florida	1	24	1	80	3	3	2	11	0	13
Iowa	3	17		4	10		84	94	36	19
Maine		7	2		105		64	28	0	23
Maryland		45	13	7	12	1	6	60	0	211
Massachusetts	8	166	4	10	142		104	214	0	48
Michigan	30	164	4	2	82		51	341	22	117
New Jersey	8	206	9		73		13	150	0	66
New York	39	241		8	241		249	306	10	244
North Dakota		12			7		7	24	3	25
Ohio	21	163	42	1	65	1	305	482	93	297
Oregon	1	9	39	13	85		2	38	5	26
Porto Rico		41	15	1,5[illegible]3	8	2			0	31
Vermont		2			6			6	0	4
Wyoming	3	4	1		1		26	15	0	3

August, 1930

Hawaii Territory:	Cases
Chicken pox	2
Conjunctivitis, follicular	11
Dysentery (amebic)	1
Dysentery (bacillary)	4
Hookworm disease	17
Leprosy	6
Mumps	5
Tetanus	3
Trachoma	1
Whooping cough	2

September, 1930

Anthrax:	Cases
New York	3
Chicken pox:	
Florida	8
Iowa	23
Maine	12
Maryland	31
Massachusetts	117
Michigan	118
New Jersey	91
New York	242

Chicken pox—Continued.	Cases
North Dakota	7
Ohio	174
Oregon	28
Vermont	54
Wyoming	2
Colibacillosis:	
Porto Rico	2
Diarrhea:	
Maryland	56
Diarrhea and enteritis:	
Ohio	111
Dysentery:	
Iowa	1
Maryland	56
Massachusetts	5
Michigan	1
New Jersey	2
New York	56
Ohio	11
Oregon	6
Porto Rico	2
Filariasis:	
Porto Rico	4
Food poisoning:	
Ohio	5
German measles:	
Iowa	1
Maine	3
Maryland	7
Massachusetts	27
New Jersey	21
New York	49
Ohio	12
Impetigo contagiosa:	
Maryland	9
Oregon	12
Lead poisoning:	
Massachusetts	10
New Jersey	3
Ohio	3
Leprosy:	
Porto Rico	1
Lethargic encephalitis:	
Florida	1
Maryland	1
Massachusetts	3
Michigan	4
New York	26
North Dakota	1
Ohio	6
Oregon	1
Mumps:	
Iowa	18
Maine	66
Maryland	17
Massachusetts	90
Michigan	48
New Jersey	32
New York	254
North Dakota	64
Ohio	60
Oregon	84
Porto Rico	11
Vermont	2
Wyoming	8

Ophthalmia neonatorum:	Cases
Iowa	1
Massachusetts	115
New Jersey	3
New York	4
Ohio	83
Porto Rico	3
Paratyphoid fever:	
Maine	1
New Jersey	1
New York	5
Ohio	8
Porto Rico	8
Puerperal septicemia:	
New York	8
Ohio	5
Porto Rico	6
Rabies in animals:	
New York	7
Scabies:	
Maryland	2
Oregon	4
Septic sore throat:	
Maine	1
Massachusetts	19
Michigan	20
New York	10
Ohio	48
Oregon	3
Tetanus:	
Iowa	1
Maine	2
Maryland	2
Massachusetts	5
New Jersey	4
New York	9
Ohio	5
Porto Rico	2
Tetanus, infantile:	
Porto Rico	35
Trachoma:	
Massachusetts	5
New Jersey	3
North Dakota	1
Ohio	18
Wyoming	1
Trichinosis:	
Massachusetts	3
New Jersey	1
Tularaemia:	
Wyoming	1
Typhus fever:	
Florida	5
Maryland	3
New York	1
Undulant fever:	
Iowa	7
Maryland	5
Michigan	1
New York	33
Ohio	13
Oregon	2
Vermont	2
Vincent's angina:	
Iowa	5
Maine	3

Vincent's angina—Continued.	Cases
Maryland	13
New York [1]	84
North Dakota	21
Oregon	1
Whooping cough:	
Florida	32
Iowa	40
Maine	146
Maryland	113
Massachusetts	517

Whooping cough—Continued.	Cases
Michigan	518
New Jersey	297
New York	1,367
North Dakota	41
Ohio	355
Oregon	63
Porto Rico	65
Vermont	35
Wyoming	11

[1] Exclusive of New York City.

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of September, 1930, by departments of health of certain States to other State health departments

Disease	Connecticut	Illinois	Kansas	Massachusetts	Minnesota	New York	Oregon	South Dakota	Washington
Diphtheria						3			
Gonorrhea					1				
Poliomyelitis	1	1			3	2		1	
Smallpox		2							
Syphilis			14		3				
Trachoma					1				
Tuberculosis		7			12		3		
Tularaemia									1
Typhoid fever	3	[1] 8		2	2	9			
Undulant fever						1			

[1] Includes 1 case of paratyphoid fever B.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,165,000. The estimated population of the 91 cities reporting deaths is more than 30,570,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended October 11, 1930, and October 12, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,448	1,927	
98 cities	412	679	877
Measles:			
45 States	617	1,043	
98 cities	136	132	
Meningococcus meningitis:			
46 States	73	94	
98 cities	33	44	
Poliomyelitis:			
46 States	553	148	
Scarlet fever:			
46 States	1,921	2,067	
98 cities	597	694	645
Smallpox:			
46 States	133	289	
98 cities	10	41	10
Typhoid fever:			
46 States	934	658	
98 cities	127	159	120
Deaths reported			
Influenza and pneumonia:			
91 cities	458	510	
Smallpox:			
91 cities	0	0	

City reports for week ended October 11, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	1	0	----------	0	0	0	3
New Hampshire:								
Concord	0	1	0	----------	0	0	0	0
Nashua	0	1	0	----------	----------	0	0	----------
Vermont:								
Barre	0	0	0	----------	0	0	0	0
Massachusetts:								
Boston	6	25	9	----------	0	8	1	14
Fall River	0	4	3	----------	0	0	0	0
Springfield	12	4	0	2	1	0	0	1
Worcester	2	4	7	2	0	0	1	1
Rhode Island:								
Pawtucket	0	1	1	----------	0	0	0	0
Providence	2	6	2	----------	0	0	0	4
Connecticut:								
Bridgeport	0	5	0	2	1	1	0	1
Hartford	1	4	2	----------	0	5	0	2
New Haven	3	1	0	----------	0	0	1	3
MIDDLE ATLANTIC								
New York:								
Buffalo	11	14	8	----------	0	2	2	7
New York	23	119	37	7	8	18	15	98
Rochester	0	4	0	----------	0	0	0	4
Syracuse	14	3	4	----------	2	1	1	2
New Jersey:								
Camden	2	6	5	----------	0	7	6	3
Newark	7	12	12	2	1	3	1	4
Trenton	2	2	0	----------	0	1	0	2
Pennsylvania:								
Philadelphia	17	48	11	1	3	1	5	26
Pittsburgh	6	20	9	----------	0	0	2	16
Reading	4	1	2	----------	0	0	4	2
Scranton	4	4	1	----------	----------	0	0	----------
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	1	10	6	1	1	2	1	6
Cleveland	11	48	7	5	0	1	14	10
Columbus	6	4	6	3	2	0	2	2
Toledo	11	8	8	1	0	0	1	2
Indiana:								
Fort Wayne	1	3	1	----------	0	0	0	1
Indianapolis	2	15	10	----------	0	0	4	16
South Bend	1	2	2	----------	0	0	0	0
Terre Haute	0	1	0	----------	0	0	0	0
Illinois:								
Chicago	40	84	94	----------	1	2	15	27
Springfield	0	0	1	2	0	0	0	0
Michigan:								
Detroit	33	59	27	3	1	7	4	13
Flint	8	4	1	----------	0	2	1	3
Grand Rapids	1	3	0	----------	0	1	0	4

City reports for week ended October 11, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	28	0	1		0	0	1	0
Madison	4	0	0			1	8	
Milwaukee	26	13	3		0	2	9	6
Racine	4	2	0		0	0	1	0
Superior	1	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	17	0	0		0	0	0	0
Minneapolis	27	30	2		0	1	12	7
St. Paul	5	12	0		0	7	0	5
Iowa:								
Des Moines	0	4	0			0	0	
Sioux City	1	2	2			0	2	
Waterloo	14	1	1			0	0	
Missouri:								
Kansas City	7	8	1		0	0	0	8
St. Joseph	0	2	0		0	0	0	0
St. Louis	1	36	18	1	1	32	2	
North Dakota:								
Fargo	1	0	0		0	0	10	2
Grand Forks	0	0	0			0	1	
South Dakota:								
Aberdeen	0	0	0			0	0	
Sioux Falls	0	0	0			1	0	
Nebraska:								
Lincoln	8	2	0		0	1	4	
Omaha	0	13	6		0	0	0	3
Kansas:								
Topeka	0	2	3	1	1	0	0	0
Wichita	0	3	2		0	0	0	4
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0		0	0	0	1
Maryland:								
Baltimore	10	22	12	3	0	1	2	18
Cumberland	0	1	1		0	0	0	6
Frederick	0	1	0		0	0	0	0
District of Columbia:								
Washington	0	14	18		0	2	0	8
Virginia:								
Lynchburg	1	3	0		0	0	0	0
Norfolk	1	4	5		0	0	1	4
Richmond	0	20	13		0	1	0	2
Roanoke	0	6	1		0	0	0	0
West Virginia:								
Charleston	0	1	1		0	0	6	0
Wheeling	2	1	0		0	0	0	0
North Carolina:								
Raleigh	0	4	4		0	1	0	0
Wilmington	0	2	1		0	0	0	0
Winston-Salem	0	5	3		0	0	1	1
South Carolina:								
Charleston	0	2	0	5	1	0	0	1
Columbia	0	2	0		0	0	0	3
Greenville	0	1	1		0	0	0	0
Georgia:								
Atlanta	0	10	2	4	0	0	0	8
Brunswick	0	0	0		0	0	0	0
Savannah	0	2	2		0	1	0	1
Florida:								
Miami	0	2	3		1	2	0	3
St. Petersburg		0			0			0
Tampa	0	2	0		0	0	0	0

City reports for week ended October 11, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	2	0	----------	0	0	0	3
Tennessee:								
Memphis	2	8	6	----------	0	1	2	4
Nashville	0	3	4	----------	0	1	0	6
Alabama:								
Birmingham	0	6	6	----------	0	1	2	5
Mobile	0	1	0	----------	0	0	0	1
Montgomery	0	3	0	----------	----------	0	0	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	2	1	----------	----------	0	0	----------
Little Rock	0	1	0	----------	0	0	0	2
Louisiana:								
New Orleans	0	10	4	1	1	0	0	16
Shreveport	1	1	0	----------	0	0	0	0
Oklahoma:								
Tulsa	1	5	8	----------	----------	1	1	----------
Texas:								
Dallas	0	15	6	----------	0	0	0	1
Fort Worth	1	4	7	----------	0	0	0	1
Galveston	0	0	0	----------	0	0	0	1
Houston	0	7	4	----------	1	0	0	2
San Antonio	0	3	2	----------	1	0	1	9
MOUNTAIN								
Montana:								
Billings	1	0	1	----------	1	0	0	1
Great Falls	1	0	0	----------	0	0	0	1
Helena	0	0	0	----------	0	0	0	0
Missoula	0	0	0	----------	0	0	0	0
Idaho:								
Boise	0	0	0	----------	0	0	0	0
Colorado:								
Denver	13	11	2	----------	0	5	1	4
Pueblo	1	1	0	----------	0	7	1	2
New Mexico:								
Albuquerque	0	1	0	----------	0	0	0	0
Arizona:								
Phoenix	0	0	1	----------	0	0	0	0
Utah:								
Salt Lake City	0	3	2	----------	0	1	1	2
Nevada:								
Reno	0	0	0	----------	0	0	0	1
PACIFIC								
Washington:								
Seattle	20	5	17	----------	----------	1	15	----------
Spokane	8	3	0	----------	----------	0	0	----------
Tacoma	2	3	1	----------	0	0	0	2
Oregon:								
Portland	13	9	2	----------	0	2	1	6
Salem	0	0	0	----------	0	0	0	0
California:								
Los Angeles	11	32	16	17	0	5	7	12
Sacramento	2	2	2	----------	0	0	7	0
San Francisco	17	14	4	1	0	4	6	2

City reports for week ended October 11, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases, reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	1	3	0	0	0	0	0	1	0	6	20
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	9
Nashua	0	1	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	0	3	0	0	0	0	3
Massachusetts:											
Boston	34	18	0	0	0	9	3	0	0	19	219
Fall River	2	2	0	0	0	1	2	0	0	1	20
Springfield	4	3	0	0	0	1	0	1	0	3	31
Worcester	7	13	0	0	0	2	1	0	0	1	42
Rhode Island:											
Pawtucket	1	0	0	0	0	0	0	0	0	0	19
Providence	3	4	0	0	0	0	1	0	0	2	41
Connecticut:											
Bridgeport	3	0	0	0	0	0	0	7	0	0	30
Hartford	3	5	0	0	0	0	1	0	0	1	38
New Haven	2	0	0	0	0	3	1	0	0	2	45
MIDDLE ATLANTIC											
New York:											
Buffalo	12	10	0	0	0	10	2	1	0	29	140
New York	54	24	0	0	0	83	27	15	0	95	1,252
Rochester	3	4	0	0	0	2	0	0	0	3	85
Syracuse	4	1	0	0	0	0	1	1	0	10	51
New Jersey:											
Camden	2	1	0	0	0	0	0	1	0	0	20
Newark	6	7	0	0	0	7	1	0	1	15	95
Trenton	0	4	0	0	0	10	1	0	0	4	49
Pennsylvania:											
Philadelphia	38	37	0	0	0	27	9	10	0	10	419
Pittsburgh	26	23	0	0	0	7	1	2	0	0	--------
Reading	1	2	0	0	0	0	1	0	0	0	25
Scranton	1	1	0	0	0	0	0	0	0	3	--------
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	10	23	0	1	0	3	1	1	0	1	130
Cleveland	20	14	0	0	0	10	2	2	0	12	158
Columbus	7	4	0	1	0	5	1	0	0	0	99
Toledo	8	11	0	0	0	4	0	1	1	0	64
Indiana:											
Fort Wayne	1	0	0	0	0	1	1	4	0	0	27
Indianapolis	9	12	1	0	0	4	2	1	1	7	--------
South Bend	1	0	0	0	0	0	0	1	0	0	14
Terre Haute	2	3	0	0	0	0	0	0	0	0	21
Illinois:											
Chicago	58	91	0	0	0	44	6	2	1	53	670
Springfield	1	2	0	0	0	0	1	0	0	0	17
Michigan:											
Detroit	48	27	1	0	0	19	4	1	0	45	250
Flint	9	9	0	1	0	0	0	1	0	2	19
Grand Rapids	6	11	0	0	0	0	0	1	0	2	29
Wisconsin:											
Kenosha	1	2	0	0	0	0	0	0	0	0	7
Madison	1	4	0	0	--------	--------	0	0	--------	4	--------
Milwaukee	16	4	0	0	0	5	1	0	0	29	100
Racine	3	14	0	0	0	0	0	0	0	5	15
Superior	2	2	0	0	0	1	0	0	0	2	9
WEST NORTH CENTRAL											
Minnesota:											
Duluth	6	3	0	0	0	3	0	0	0	7	23
Minneapolis	34	3	0	0	0	3	1	0	0	4	88
St. Paul	15	7	0	0	0	1	1	0	0	5	56
Iowa:											
Des Moines	6	0	0	0	--------	--------	0	0	--------	0	24
Sioux City	2	2	0	0	--------	--------	0	0	--------	2	--------
Waterloo	2	0	0	0	--------	--------	0	0	--------	2	--------

City reports for week ended October 11, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—con.											
Missouri:											
Kansas City	11	5	0	1	0	5	2	0	0	0	99
St. Joseph	2	7	0	0	0	0	0	0	0	0	27
St. Louis	23	9	1	1	0	9	4	3	0	3	210
North Dakota:											
Fargo	1	0	0	0	0	1	0	0	0	1	8
Grand Forks	0	0	0	0	-------	-------	0	0	-------	0	-------
South Dakota:											
Aberdeen	0	0	0	0	-------	-------	0	1	-------	0	-------
Sioux Falls	2	0	0	1	-------	-------	0	0	-------	0	8
Nebraska:											
Lincoln	0	5	0	0	-------	-------	0	0	-------	5	-------
Omaha	3	9	0	1	0	1	0	0	0	1	42
Kansas:											
Topeka	4	1	0	0	0	0	0	2	0	1	15
Wichita	3	2	0	0	0	1	0	0	0	3	26
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	3	0	0	0	0	0	0	0	0	29
Maryland:											
Baltimore	10	14	0	0	0	12	7	16	1	21	201
Cumberland	0	4	0	0	0	1	0	1	0	0	18
Frederick	0	0	0	0	0	0	0	0	0	0	-------
District of Col.:											
Washington	12	10	0	0	0	21	3	5	0	0	129
Virginia:											
Lynchburg	2	1	0	0	0	0	0	2	0	0	12
Norfolk	1	1	0	0	0	2	0	1	0	0	-------
Richmond	9	7	0	0	0	2	1	2	0	0	46
Roanoke	4	1	0	0	0	0	1	1	0	0	11
West Virginia:											
Charleston	3	0	0	0	0	0	0	2	0	0	9
Wheeling	2	0	0	0	0	0	0	0	0	0	29
North Carolina:											
Raleigh	1	0	0	0	0	0	0	0	0	1	12
Wilmington	1	1	0	0	0	0	0	0	0	4	9
Winston-Salem	3	6	1	0	0	1	0	0	0	0	12
South Carolina:											
Charleston	1	2	0	0	0	0	2	1	0	0	14
Columbia	1	3	0	0	0	0	0	0	0	0	11
Greenville	1	1	0	0	0	0	0	0	0	0	-------
Georgia:											
Atlanta	7	11	0	0	0	3	1	4	1	1	86
Brunswick	0	0	0	0	0	1	0	0	0	0	9
Savannah	1	0	0	0	0	2	0	0	0	0	28
Florida:											
Miami	1	1	0	0	0	2	0	1	0	3	2
St. Petersburg	0	-------	0	-------	0	0	0	-------	0	-------	7
Tampa	1	0	0	0	0	0	1	1	0	0	14
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	3	0	0	0	1	0	1	0	0	20
Tennessee:											
Memphis	4	6	0	0	0	6	3	1	0	3	55
Nashville	2	3	0	0	0	5	3	2	0	1	42
Alabama:											
Birmingham	5	14	1	0	0	3	2	3	1	1	50
Mobile	1	0	0	0	0	0	0	0	0	0	17
Montgomery	1	1	0	0	-------	-------	0	0	-------	1	-------

City reports for week ended October 11, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases, reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	1	0	0			0	0		0	
Little Rock	3	1	0	0	0	3	0	3	0	0	
Louisiana:											
New Orleans	3	4	0	0	0	9	3	3	1	2	134
Shreveport	0	1	0	0	0	1	0	0	0	0	23
Oklahoma:											
Tulsa	3	12	0	0			1	1		1	
Texas:											
Dallas	5	2	0	0	0	1	2	5	0	0	35
Fort Worth	2	3	0	0	0	1	1	3	0	0	24
Galveston	0	0	0	0	0	1	0	0	0	0	15
Houston	1	1	0	0	0	2	0	2	0	0	58
San Antonio	1	0	0	1	0	9	1	1	0	0	49
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	1	0	1	1	12
Great Falls	1	10	0	0	0	0	0	0	0	0	8
Helena	1	0	0	0	0	0	0	0	0	6	5
Missoula	0	1	0	0	0	0	0	0	0	2	1
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	2	3
Colorado:											
Denver	7	13	0	0	0	9	1	1	0	16	91
Pueblo	1	0	0	0	0	1	0	3	0	1	11
New Mexico:											
Albuquerque	1	0	0	0	0	5	3	3	0	2	7
Arizona:											
Phoenix	1	1	0	0	0	0	0	0	1	0	9
Utah:											
Salt Lake City	2	9	0	0	0	1	3	1	0	7	31
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	6	17	1	0			2	2		5	
Spokane	7	1	1	2			0	0		0	
Tacoma	2	1	2	0	0	0	0	0	0	1	14
Oregon:											
Portland	5	2	2	0	0	1	1	0	0	0	72
Salem	0	0	0	0	0	0	2	0	0	0	
California:											
Los Angeles	15	9	1	0	0	26	2	6	0	14	282
Sacramento	2	2	0	0	0	3	1	0	0	6	30
San Francisco	9	7	0	1	0	7	1	0	1	11	148

City reports for week ended October 11, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	9	0
Massachusetts:									
Boston	0	0	0	0	0	0	2	26	2
Worcester	0	0	0	0	1	0	0	0	0
Rhode Island:									
Providence	0	0	0	0	0	0	0	1	0
Connecticut:									
Hartford	0	0	0	0	0	0	1	1	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	0	0	0	0	0	1	0
New York	8	5	2	0	0	0	17	11	0
Rochester	0	0	0	0	0	0	1	7	1
Syracuse	0	0	0	0	0	0	0	6	1
New Jersey:									
Trenton	1	1	0	0	0	0	0	1	0
Pennsylvania:									
Philadelphia	2	0	0	0	0	0	0	4	0
Pittsburgh	1	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	0	0	0	1	4	0
Cleveland	2	0	0	0	0	0	1	11	1
Columbus	2	0	0	0	0	0	0	2	1
Toledo	0	0	0	0	0	0	0	2	0
Indiana:									
Indianapolis	0	1	0	0	0	0	1	2	0
Illinois:									
Chicago	0	0	1	1	1	1	3	16	2
Springfield	0	0	0	0	0	0	0	4	0
Michigan:									
Detroit	6	2	2	0	0	0	3	5	1
Grand Rapids	0	0	0	0	0	0	0	1	1
Wisconsin:									
Milwaukee	0	0	0	0	0	0	1	5	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	0	0	0	0	0	0	3	0
Iowa:									
Des Moines	0	0	0	0	0	0	1	3	0
Sioux City	0	0	0	0	0	0	1	4	0
Missouri:									
Kansas City	0	1	0	0	0	0	1	5	0
St. Louis	2	2	0	0	0	0	0	4	0
Nebraska:									
Lincoln	0	0	0	0	0	0	0	3	0
SOUTH ATLANTIC									
Maryland:									
Baltimore [1]	1	0	0	0	0	0	1	2	0
District of Columbia:									
Washington	1	1	0	0	0	0	0	1	0
Virginia:									
Lynchburg	0	1	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	0	2	0	0	0
Wilmington	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	4	0	0	0	0
Georgia: [1]									
Atlanta	0	0	0	0	1	1	0	0	0
Brunswick	0	0	0	0	0	1	0	0	0
Florida:									
Miami	0	0	0	0	1	1	0	0	0
St. Petersburg	0	0	0	1	0	0	0	0	0

[1] Typhus fever, 5 cases and 1 death: 1 case at Baltimore, Md., and 4 cases and 1 death at Savannah, Ga.

City reports for week ended October 11, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Kentucky:									
Covington	0	0	0	0	0	0	0	1	0
Tennessee:									
Memphis	2	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	1	1	0	0	0	0	1	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	2	1	0	1	0
Shreveport	0	0	0	0	0	2	0	0	0
Oklahoma:									
Tulsa	0	0	0	0	0	0	0	2	0
Texas:									
Dallas	0	0	0	0	1	1	0	0	0
Galveston	0	0	1	1	0	0	0	0	0
Houston	0	0	0	0	0	0	0	1	1
MOUNTAIN									
Colorado:									
Denver	1	1	0	0	0	0	0	3	0
Pueblo	0	0	0	0	0	0	0	1	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	1	0	0
Oregon:									
Portland	0	1	0	0	0	0	0	0	0
California:									
Los Angeles	1	0	0	0	0	0	1	4	1
Sacramento	0	0	0	0	0	0	1	1	0
San Francisco	0	0	0	0	0	0	0	25	2

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended October 11, 1930, compared with those for a like period ended October 12, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, September 7 to October 11, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929
98 cities	45	66	47	75	58	83	[2] 62	97	72	112
New England	55	47	31	49	51	76	49	88	53	94
Middle Atlantic	28	41	38	54	33	60	43	62	42	75
East North Central	64	95	75	96	75	90	80	124	100	139
West North Central	55	58	47	64	57	100	[3] 62	108	66	123
South Atlantic	62	133	42	114	92	112	62	129	106	139
East South Central	27	116	27	137	34	137	115	157	108	232
West South Central	49	61	67	149	146	164	112	198	64	255
Mountain	34	26	26	70	60	26	[4] 9	26	43	0
Pacific	26	22	14	19	31	65	[5] 62	56	94	60

MEASLES CASE RATES

98 cities	16	16	16	15	18	13	[2] 19	16	22	22
New England	38	16	18	31	42	18	33	34	31	16
Middle Atlantic	20	12	17	7	13	10	12	12	16	12
East North Central	9	20	14	17	13	13	5	12	11	29
West North Central	15	6	19	6	28	10	[3] 73	10	76	23
South Atlantic	5	7	20	7	9	13	20	11	11	9
East South Central	7	7	0	7	74	0	0	0	20	14
West South Central	4	11	0	8	11	11	7	0	0	4
Mountain	34	61	43	26	26	44	[4] 73	35	112	61
Pacific	19	39	21	51	19	24	[5] 27	65	24	65

SCARLET FEVER CASE RATES

98 cities	51	54	62	68	72	95	[2] 74	102	97	114
New England	51	52	71	49	80	99	73	135	106	162
Middle Atlantic	27	16	47	25	33	42	49	48	54	48
East North Central	85	90	91	121	118	161	107	149	137	173
West North Central	34	58	44	92	76	108	[3] 73	119	91	140
South Atlantic	51	47	40	66	57	105	70	120	115	139
East South Central	40	96	40	28	128	75	74	82	182	123
West South Central	26	91	56	72	56	72	37	72	37	130
Mountain	77	70	69	113	94	139	[4] 118	131	283	148
Pacific	73	72	78	68	87	84	[5] 89	128	87	87

SMALLPOX CASE RATES

98 cities	3	3	5	5	3	4	[2] 1	7	2	7
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	1
East North Central	2	4	9	10	3	3	1	7	2	3
West North Central	27	8	21	6	13	8	[3] 0	2	6	13
South Atlantic	0	2	0	0	0	0	2	0	0	0
East South Central	0	0	0	0	0	0	0	48	0	0
West South Central	0	0	0	0	4	0	4	0	4	4
Mountain	0	9	0	52	0	96	[4] 0	52	0	96
Pacific	9	12	5	17	19	10	[5] 2	36	7	34

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930 and 1929, respectively.
[2] Kansas City, Mo., Great Falls, Mont., and Spokane, Wash., not included.
[3] Kansas City, Mo., not included.
[4] Great Falls, Mont., not included.
[5] Spokane, Wash., not included.

Summary of weekly reports from cities, September 7 to October 11, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 —Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Sept. 13, 1930	Sept. 14, 1929	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929
98 cities	27	21	22	22	18	20	[2] 20	16	21	26
New England	20	16	11	13	11	7	11	11	20	16
Middle Atlantic	25	18	16	14	14	12	15	14	14	10
East North Central	17	10	11	11	9	9	9	12	9	8
West North Central	21	17	28	6	15	23	[3] 13	15	9	8
South Atlantic	64	34	62	26	51	17	38	30	64	26
East South Central	54	89	54	0	20	82	67	21	47	27
West South Central	56	50	67	84	37	27	56	8	52	27
Mountain	60	70	0	340	43	313	[4] 118	113	43	749
Pacific	5	19	17	7	14	10	[5] 20	10	19	7

INFLUENZA DEATH RATES

91 cities	3	3	3	2	3	5	[6] 3	6	5	8
New England	0	0	2	2	2	2	0	4	4	0
Middle Atlantic	4	2	2	0	2	5	2	7	7	8
East North Central	3	2	3	2	2	4	1	5	3	8
West North Central	0	6	0	6	0	3	[3] 0	6	6	3
South Atlantic	2	2	0	2	4	6	2	7	2	11
East South Central	22	7	29	7	15	0	15	0	0	22
West South Central	0	12	8	0	4	12	11	16	11	16
Mountain	0	9	17	9	0	17	[4] 18	0	9	26
Pacific	0	0	0	9	6	3	3	9	0	6

PNEUMONIA DEATH RATES

91 cities	55	55	58	54	58	67	[6] 60	77	73	80
New England	62	36	51	29	35	72	40	36	64	74
Middle Atlantic	67	66	68	59	76	72	63	93	78	87
East North Central	43	47	43	47	48	54	54	61	55	65
West North Central	44	45	74	39	35	81	[3] 81	108	86	54
South Atlantic	53	52	51	66	61	60	48	81	79	103
East South Central	29	90	81	67	74	119	118	30	140	104
West South Central	61	55	50	51	77	94	77	113	119	113
Mountain	120	70	112	104	51	70	[4] 137	87	94	122
Pacific	31	41	49	57	49	38	49	47	49	57

[2] Kansas City, Mo., Great Falls, Mont., and Spokane, Wash., not included.
[3] Kansas City, Mo., not included.
[4] Great Falls, Mont., not included.
[5] Spokane, Wash., not included.
[6] Kansas City, Mo., and Great Falls, Mont., not included.

FOREIGN AND INSULAR

CANADA

Montreal—Typhoid fever—October 15–22, 1930.—During the period October 15 to 22, 1930, 37 cases of typhoid fever were reported in Montreal, Canada. The Director of Health of Montreal states that an investigation revealed unsatisfactory conditions in three milk depots in the city, which have since been corrected, and that two suspect carriers had been detected. It is believed that the measures taken will control the situation.

Provinces—Communicable diseases—Weeks ended October 4 and October 11, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the weeks ended October 4 and October 11, 1930, as follows:

Week ended October 4

Disease	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia				6		3
New Brunswick						11
Quebec			1	3		20
Ontario	4		1	34		13
Manitoba				4		7
Saskatchewan				1	3	5
Alberta				6	13	3
British Columbia	1	8		3		8
Total	5	8	2	57	16	70

Week ended October 11

Disease	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia				5		1
New Brunswick						7
Quebec	1		3	1		20
Ontario			2	46	3	61
Manitoba				1		4
Saskatchewan				3		5
Alberta				7	8	3
British Columbia	2	2		3		6
Total	3	2	5	66	11	107

[1] No case of any disease included in the table was reported during the week.

Ontario Province—Communicable diseases (comparative)—Four weeks ended September 27, 1930.—During the four weeks ended September 27, 1930, and in the corresponding period of 1929 certain com-

municable diseases were reported in the Province of Ontario, Canada, as follows:

Disease	1929		1930	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	6	1	16	1
Chancroid			2	
Chicken pox	196		102	
Diphtheria	338	23	247	5
Dysentery	10	9	8	2
Erysipelas	1			
German measles	2		5	
Gonorrhea	260		283	
Influenza	3	2	18	2
Lethargic encephalitis	2	2		1
Measles	177		51	
Mumps	112		42	
Paratyphoid fever	2		7	
Pneumonia		104		63
Poliomyelitis	227	9	215	11
Scarlet fever	193	1	192	
Septic sore throat	1	2		1
Smallpox	19		[1] 9	
Syphilis	114		203	
Tetanus	1			
Trichinosis	1	1		
Trachoma			1	
Tuberculosis	121	54	146	51
Typhoid fever	98	11	102	2
Undulant fever	1		3	
Whooping cough	461	5	317	

[1] Cases of smallpox were distributed as follows: Ottawa, 3; Kingston, 3; Chapleau, 1; Plympton, 1; and Toronto, 1.

Quebec Province—Communicable diseases—Week ended October 11, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended October 11, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	12
Chicken pox	26	Poliomyelitis	1
Diphtheria	46	Scarlet fever	60
Erysipelas	1	Smallpox	4
German measles	1	Tuberculosis	24
Influenza	3	Typhoid fever	20
Measles	39	Whooping cough	64

CZECHOSLOVAKIA

Communicable diseases—July, 1930.—During the month of July, 1930, certain communicable diseases were reported in Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	54	1	Puerperal fever	45	15
Cerebrospinal meningitis	14	3	Rabies	1	1
Diphtheria	1,221	84	Scarlet fever	1,431	44
Dysentery	100	15	Trachoma	158	
Malaria	42		Typhoid fever	657	44
Paratyphoid fever	54	1	Typhus fever	1	

MEXICO

Vera Cruz—Deaths from certain diseases—Six weeks ended October 4, 1930.—During the six weeks ended October 4, 1930, deaths from certain diseases were reported in Vera Cruz, Mexico, as follows:

Disease	Week ended—					
	Aug. 30, 1930	Sept. 6, 1930	Sept. 13, 1930	Sept. 20, 1930	Sept. 27, 1930	Oct. 4, 1930
Bronchitis			1			1
Cancer				3	1	1
Cerebrospinal meningitis			2	1	3	
Diphtheria	1					
Dysentery	1				1	
Gastrointestinal disorders	7	7	6	7	10	4
Hookworm disease			1			1
Malaria	3	2	3		2	2
Measles				1		
Pneumonia	3	2	4	4	4	1
Syphilis					1	
Tuberculosis	2	4	6	4	3	7
Typhoid fever	2		1	1	1	
Whooping cough	1					

VIRGIN ISLANDS

Communicable diseases—September, 1930.—During the month of September, 1930, cases of certain communicable diseases were reported in the Virgin Islands as follows:

St. Thomas and St. John:	Cases	St. Croix:	Cases
Gonorrhea	1	Gonorrhea	2
Syphilis	21	Syphilis	1

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18
Afghanistan	C				[1] P				P								
China:																	
Amoy	C											1	1				
	D											1	1				
Canton	C		3	2	2												
	D				1												
Shanghai	C									8	4		22	23	5		
	D										1	1	1	2			
Shensi Province	C												P				
Swatow	C		3	7		1			2	1	1						
Tientsin	C								2	1							
India	C	41,462	56,311	37,102	26,121	7,199	11,597	11,993	12,104								
	D	27,906	44,878	25,711	13,822	3,676	6,033	6,345	6,304								
Bassein	C	7	7								1						
	D	5	5														
Bombay	C					3	2	3	6					1	3		
	D					2	1	1	4					1	2		
Calcutta	C	647	609	327	220	18	10	17	18	8	10		9	4	4		
	D	414	372	179	128	7	7	10	6	3	3		6	3	4		
Negapatam	C			1													
	D			1													
Rangoon	C	1	9	6	1	1				1	1						
	D	1	3	4	1	1				1							
India (French):																	
Chandernagor	C	6	6	3	1						1						
	D	5	6	2													
Karikal	C	1		3													
	D	1		3													
India: Portuguese	C							1			1						

Indo-China (see also table below):																	
Pnompenh	C	2	1	40	32	5	3	3						1			
	D		5	18	22	3	2	1									
Saigon and Cholon	C	76	160	48	10	2	2	1						1			
	D	55	101	23	3		1										
Philippine Islands:[2]																	
Ports—																	
Cebu	C			1	65	5	4			1	1						
	D				36	4	4			1	1						
Iloilo	C				29	9	19	32	4	3	4	1	2	1			
	D				22	10	18	19	9	4	5	2	3	2			2
Manila	C		1				1			16	13	10	4	2	1	2	
	D									5	6	1			1		
Provinces—																	
Antique	C					14	3		3	2	25	12	8	12		28	
	D					7	3		2	1	14	12	7	8		10	
Bohol	C						54	54	30	30	14	4	1				
	D						29	32	18	12	6	2					
Bulacan	C			3	4	1				1	2	1			2		
	D			1						1	1				1		
Capiz	C				3	1	1			1							
	D				2	1	1										
Cebu	C		1	355	713	55	26	4		1	16	8					
	D		1	170	303	32	15	3		1	6	4					
Iloilo	C			2	309	143	209	127	92	71	60	61	46	18	7	13	12
	D			1	193	77	143	91	65	45	45	35	26	15	6	7	12
La Union	C				1												
Leyte	C			47	11												
	D			19	11												
Masbate	C			10	92	15	19										
	D			3	35	5	9										
Misamis, Occidental	C				3												
	D				3												
Negros, Occidental	C		10	140	568	151	79	45	68	40	43	24	15	8	10	5	5
	D		7	88	368	97	64	33	43	32	30	20	9	6	5	6	3
Negros, Oriental	C				23	6	2										
	D				13	1	3										
Nueva Acija	C				1												
	D				1												
Pampanga	C			2	2					1							
Pangasinan	C				3	1											
	D				2	1											
Rizal	C			1	1												
	D			1	1												
Samar	C						5	3	10			3	1	4			3
	D						5	3	8			2		4			3
Surigao	C						15	2	11	1				(3)			
	D						9	2	6	2							
Tarlac	C					1											

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, Philippine Islands.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930					September, 1930				October, 1930		
						2	9	16	23	30	6	13	20	27	4	11	18
Siam	C	29	33	27	20		1	1	1							1	
	D	13	21	19	9		1		1								
Bangkok	C	15	9	12	8			1								1	
	D	4	3	5	3			1								1	
Nagara Pathom	C	10															
	D	2															
Songkla	C				10												
	D				6												
On vessel:																	
S. S. Malwa from Shanghai	D												1				
S. S. Sassari at Massoua, from Jeddah	C		1														
	D		1														
On small boat at Port Cebu, from Bantayan Island	C			1													
	D			1													

Place		March, 1930	April, 1930	May, 1930	June, 1930			July, 1930			August, 1930			September, 1930		
					1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20	21–30
Indo-China (French) (see also table above):																
Annam [1]	C	52	60	23	2	14				1		3				
Cambodia [1]	C	81	24	88	56	88				43	37	22		23	13	2
Cochin-China [1]	C	82	48	671	147	126				46	22	5		9	6	18

[1] Reports incomplete.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18
Algeria:																	
Algiers	C				3		1		6	1	2	6	2	1	1	2	
Constantine	C			1	1												
Oran	C				3	1	1	1	1	1	2	3	4				
Philippeville	C										1			1		1	
Azores: Ponta Delgada	C	8															
	D	5															
Belgian Congo	C				2	1		1		2	3						
	D				2	1		1			3						
British East Africa (see also table below):																	
Tanganyika	C	44															
	D	20															
Uganda	C	117	227	406	228	52	67	62	55	44							
	D	105	195	328	213	50	64	62	53	37							
Canary Islands: Las Palmas	D					1											
Ceylon:																	
Colombo	C	1	6	1	3			1	1	2				1	1		
	D	1	5	1	3			1	1	3				1	1		
Plague-infected rats		4		1													
Chile: Antofagasta	C	1															
	D	1															
China: Manchuria—Tungliau and Nungan	C								30			29	P	2			
Dutch East Indies:																	
Batavia and West Java	C	87	82	98	84	19	30	20	14	13	14						
	D	81	82	98	84	19	30	20	14	12	14						
Plague-infected rats		8	5	4			1				1	1					
Java and Madura	D	173	185	202	217	45	51	47	45	55	54	67					
Ecuador (see table below).																	
Egypt:																	
Alexandria	C	2	13	19	23	2	2	4	3	3	3	2	2	2	1	3	3
	D	2	3	9	10	2	1	3		5	1	2		3	1	1	1
Assiout	C	14	20	9	2												
	D	5	5	3	2												
Beni-Suef	C								1								
Dakahlieh	C	5	11	1													
	D		2														
Gharbieh	C	1				3											
	D	1				1											
Girga	C	1			1					1							
Minieh	C		7	10	3												
	D		1	1													
Port Said	C	1	2	2	1	1											

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18
France:																	
Marseille	C									2	2	1					4
St. Ouen	C				1												
	D				1												
Gambia	C								4								
	D								4								
Greece (see also table below):																	
Patras	C			1	1												
Pyrgos	C														2		
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats				1													
India	C	2,215	648	240	377	145	189	293	250								
	D	1,960	635	187	256	98	84	154	141								
Bassein	C									1		1					
	D									1		2					
Bombay	C	4	6	3	1						1			1			
	D	8	5	2	1						1				1		
Plague-infected rats		108	81	26	52	10	8	9	9	12	9	11	15	21	13		
Madras Presidency	C	44	38	39	47	35	21	7	18		47						
	D	19	11	22	31	13	9	1	11		23						
Rangoon	C	5	4	1	2	2	1			2	1	5	2	2			
	D	4	3	1	2	1	1			2	1	4	2	2			
Plague-infected rats		4	5	1	6	4		2	1	2		2	4		1		
India (Portuguese)	D		7					P									
Indo-China (see also table below):																	
Pnompenh	C	3	3	6	2		2		2	2	1			1	1		
	D	4	1	7	2									1	1	1	
Saigon and Cholon	C		1	2				1			1			1			
	D			1													
Iraq: Baghdad	C	6	37	28	18	4	3	2							1		
	D	2	18	15	7		2	1							1		
Japan: Osaka (vicinity of)—Plague-infected rats		3															
Kwang-Chow-Wan	C	37	34	31	4			1									
Madagascar (see also table below): Tamatave	C	1		1	1	2					1	P			1		
Morocco	C	121	71	3	1		8	7									
	D	45	34	4			1	1									

Nigeria: Lagos	C		2	5	1	2	1	3	1	1	1		1				
	D		2	5	1	2	1	3	1	1	1		1				
Plague-infected rats		7	17	11	18			4	4		4						
Senegal (see table below).																	
Siam	C	5	5			2	3		2	3							
	D	6	4			1	3		2	2							
Bangkok	C		5			1	2										
	D		4				2										
Nagara Pathom	C	10															
	D	9															
Nagara Rajsima	C	1				1			1		1						
	D	1				1			1		1						
Syria: Beirut	C			12	9		1		1	3	2						
Tripolitania	C							2									
Tunisia:																	
Sfax district	C	1	21	9	6		1										
Tunis	C	4	1	1	5												
	D			1	1												
Union of Socialist Soviet Republics:																	
Salsk Region	C			2	5	4		3									
	D			1	4	3		2									
Stavropol Region	C			1													
	D			1													
Union of South Africa:																	
Cape Province	C		P	1	1				1				1				
	D				1			1				1					
Orange Free State	C	1								1							
	D									1							

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
British East Africa (see also table above):							
Kenya	C	85	16	171	107	97	87
Ecuador: Guayaquil	C	2	0	0	0		
	D	0	0	0	0		
Plague-infected rats		2	0	0	0		
Greece (see also table above)	C		1		1		
Indo-China (see also table above)	C	27	4		11	1	2
Madagascar (see also table above):							
Ambositra Province	C	25	14	1			
	D	20	12	1			
Antisirabe Province	C	38	46	19	3	8	
	D	36	45	19	3	8	
Itasy Province	C	4					
	D	4					
Miarinarivo Province	C	14	1	5	1	1	
	D	14	1	5	1	1	

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
Madagascar (see also table above)—con.							
Moramanga Province	C	5	3	1	3		
	D	5	3		3		
Tananarive Province	C	52	39	15	16	11	
	D	52	38	14	16	11	
Senegal:							
Baol [1]	C	18	24	13	2	62	79
	D	8	12	11	2	48	20
Dakar [1]	C		2	52	53	140	108
	D		2	42	117	122	90
Louga [1]	C		33	54	60	138	75
	D		10	27	21	103	33
Thies [1]	C	3	12	21	52	54	34
	D	2	9	8	35	30	20
Tivaouane [1]	C	11	71	135	43	119	110
	D	8	38	69	28	70	54

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930 5	12	19	26	August, 1930 2	9	16	23	30	September, 1930 6	13	20	27	Oct. 4, 1930
Algeria:																			
Algiers	C	5	1	3			1				1		2						
Constantine	C				1			1											
Oran	C	1																	
Arabia: Aden	C	3	1			1													
Bolivia: La Paz.[1]																			
British East Africa (see also table below):																			
Tanganyika	C	103	57	409	1,610	64	4		100	26	51	44	121	198	288				
	D	7	14	70	301	13	2		27	4		3	30	4	55				
British South Africa:																			
Northern Rhodesia	C	9	1	59															
	D		2	9															
Southern Rhodesia	C		66	155	79	1	12	18					1	1					
	D		1	13															
Canada:																			
Alberta	C	10	4				2	1	2	1							1		13
Edmonton	C	4	3																
British Columbia—Vancouver	C	20	17	4	2	2	2	1	1	1	1	2	2			1	1	1	
Manitoba	C	4	4	10	4									1					
Ontario	C	100	77	82	47	3	5	6	10	8	3	5	4	2	2	6		1	
North Bay	C			1															
Ottawa	C	19	21	25	15	1	1	4	7	5	1	1		2	1	2			
Toronto	C			4	4		1									1			
Quebec	C				4	3					2	2	1						
Montreal	C									7									
Saskatchewan	C	47	41	39	22		2		3				8			1			3
Regina	C			4															
Ceylon: Angoda, Western Province	C		6																
	D		2																
China:																			
Canton	C	6	3																
	D	2	3																
Changking	C		P	P	1	P	P	P	P	P		P	P	P	P	P	P		
Foochow	C		P	P	P		P		P		P		P						
Hong Kong	C	38	18	12	4		2												
	D	25	23	9	3		1												

Manchuria—																			
Harbin	C		1	20	4				3			2							
Kwantung—Dairen	C		2	8	16	8													
	D			4	1														
Nanking	C	P	P	P	P		P	P	P	P	P	P	P	P	P	P			
Shanghai—																			
Foreigners only	C	2	3	2	5	1	1	1	1	3						18			
Including natives	D	10	10	5	3											2			
Swatow	D	6	3	6	4	1				1		2	1	1	1			1	
Tientsin	C	2	2	1															
Chosen (see table below).																			
Colombia:																			
Barranquilla	C	2	1							2									
Buenaventura	C		15	4	6	4	3	2	1		1	1							
Costa Rica:																			
Port Limon	C		6	2	2														
San Jose [2]	C	10	7	2															
Curacao (alastrim)	C	14	2	2	1	2						1							
Dutch East Indies:																			
Borneo	C	185	90	16	12		2												
	D	12	31	1	1														
Java—																			
Batavia and West Java	C	78	64	12	13	3	1	3	1	1	4	5	2	2		2	1		
	D	6	11	7	3	2	1	1	1	1	1	1	2	2		1			
East Java and Madura	C		4					1											
Sanggi Islands	C	5	160	26				11		36				14					
	D	1	24	5				3		2				3					
Sumatra	C	48																	
	D	5																	
Egypt: Port Said	C		1	1			2		1										
France (see table below).																			
Great Britain:																			
England and Wales	C	1,700	1,427	1,417	926	156	138	126	109	70	86	95	93	99	106	75	61	82	74
Ashton under Lyne	C	15	18	17	7		4	2	2					1					
Bradford	C		3	2		1													1
Cardiff	C	2	3			2													
Leeds	C	16	2			1													
London	C	710	602	637	498	84	52	62	48	36	50	41	51	43	44	36	41	30	34
London and Great Towns	C	1,239	1,066	1,078	753	127	96	102	83	61	73	71	80	79	84	51	54	55	56
	D	3	3																
Sheffield	C	8	2																
Stoke-on-Trent	C	122	85	62	32	3	2	1	3	1	1					1	1		
Scotland	C				4		1								5				
	D						1												
Honduras: Naco	C															5			
India	C	39,329	34,843	22,835	12,962	2,258	2,006	1,853	1,513	11,313	1,282	1,236	1,046						
	D	9,109	6,983	5,451	3,531	733	580	577	458	368	327	290	261						
Bombay	C	718	430	218	113	17	15	11	7	6	2	2	2	2	1	1			
	D	431	270	161	79	13	9	9	2	5	2	1	2	2	1	2			

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica, outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 9–Apr. 5, 1930	Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930				August, 1930					September, 1930				Oct. 4, 1930
						5	12	19	26	2	9	16	23	30	6	13	20	27	
India—Continued.																			
Calcutta	C	361	495	302	161	27	19	13	14	4		12	9	4	5	3	2	3	4
	D	305	403	258	146	17	17	12	10	4		8	9	3	4	1	1	3	4
Cochin	C	291	183	37	16			4	2	2	4	4	4	1	1		1		
	D	35	13	8	4									1					
Karachi	C	33	30	14	7				1	2		2				1	3		
	D	47	17	4	3					2		1					2		
Madras	C	173	133	72	35	6	10	17	16	19		9	10	9	11	6	8	4	
	D	36	27	15	10	4	1	3	4	3		5	3	1	1	1	3	1	
Moulmein	C	146	43	89	21	4	10	3	1				2	1					
	D	41	7	21	7	3	4	1	2				1			1			
Negapatam	C			1	2			1		2		2		1	2		6	4	2
Rangoon	C	10	4	6	9	2	1	1		1	1	1							
	D	5		1	2														
Tuticorin	C			5	1														
Vizagapatam	C	69	6	5	1														
	D	18	2	3															
India (French):																			
Chandernagor	C	6	10	24	19	3	1	4								1	2		
	D	2	2	7	3	1	1	1							1	1			
Karikal	C	24	19	12	11	1		1			8		1		5			1	
	D	7	8	3	8	1		1			8		1		2			1	
Pondicherry Province	C	21	24	40	23	4	9	8	5	7	8		7	11	7	7	10	11	
	D	13	20	36	23	3	9	8	5	7	8		7	11	7	7	8	11	
India (Portuguese)	C	38	44	17	28	1				1	6	1	1	1	2				
	D	2	8	8	10				1	1			1						
Indo-China (see also table below):																			
Pnompenh	C			3				1											
	D		2		1			1				1							
Saigon and Cholon	C	3	5	3	1						1			1					
	D	1	5	2						1	1	1		1					
Iraq:																			
Baghdad	C		8	1	1	1	1	1				1							
	D		1	1				1				1							
Basra	C		1																

Mossoul Liwa	C		22	21	4	47	20											63	
	D		3	3	1	19	1											27	
Ivory Coast (see table below).																			
Jamaica (alastrim)	C			2															
Japan: Tokyo	C		1																
	D		1																
Macao	D	3	2	1															
Mexico (see also table below):																			
Jalisco (State) Guadalajara	D	22	20	7	15	3	1				1								
Juarez	C	2			6						2								
	D				1						1							1	
Mexico City and surrounding territory	C	106	99	80	77	10	12	4	11	2	3	3	2	7	2	1	2		
	D	31	47	32	17	2	3	1	2	1	3	2		1	1	1	2		
Progreso	C			1															
	D			1	1														
Morocco (see table below).																			
Nigeria: Lagos	C	1	1		1														
Poland	C		7	3	2														
Portugal:																			
Lisbon	C	7	8	8	10		7		6		6	19	25	7	8		12	4	5
Oporto	C												1						
Rumania	C	2																	
Siam	C		8	2		2		4											
	D		4					3											
Somaliland, British: Boales	C	2																	
	D	6																	1
Spain	C				12		1	1	3	2					4	1			
Straits Settlements	C	5	5	11	9	1	2	7	1	1	1	1	5	1	2	2	1	1	1
	D	1	2	3	2	1	1	1				1	1		1				
Sudan (Anglo-Egyptian)	C	60	42	19	67	8	1		3				42	102	5	20	1	25	1
	D	5	4	2	3		1						3	50	2			2	
Sudan (French) (see table below).																			
Switzerland: Berne Canton	C								1	1	1							1	
Syria (see table below).																			
Taiwan: Taihoku (see table below).																			
Tunisia: Tunis	C	3	4	2	2				1								2		
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P					P										
Orange Free State	C	P						P	P	P									
Transvaal	C	P									P	P	P	P	P				
Upper Volta	C	2	3	1	13														
Zanzibar	C	13																	
On vessel:																			
S. S. Elysia, at Port Sudan, from Bombay	C		1																
S. S. Naldera, at Port Said	C			1															
S. S. Manoa, from Honolulu to San Francisco	C					1													

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		March, 1930	April, 1930	May, 1930	June, 1930			July, 1930			August, 1930			September, 1930	
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Indo-China (see also table above)	C	26	261	305	80	133				238	59	34		54	52
Ivory Coast	C	7													
Sudan (French)	C	609	521	274	76				34				39		P
	D	49	36	32	18								3		
Syria: Beirut	C	17	19	7	6	1				2	1				
Taiwan: Taihoku	C	58	12												

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
British East Africa (see also table above):							
Kenya	C	175	174	171	142	186	
Uganda	C			78			
	D			69			
Chosen	C	236	253	107		3	
	D	53	53	35			
Seishin	C		5	2	1	2	
	D		1	1			
France	C	8	58	51			
Mexico: Durango (see also table above)	D	5	4	4	3	3	3
Morocco	C	17	10	18	5	3	
Turkey	C		3	16			

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4-31, 1930	June 1-28, 1930	Week ended— July, 1930				August, 1930					September, 1930				October, 1930	
					5	12	19	26	2	9	16	23	30	6	13	20	27	4	11
Algeria:																			
Algiers	C	8	15	3		1	2	3				2		3					
Constantine Department	C	15	6	12		1	1					3							2
Oran	C		3	4		2	1			1			1						

Bolivia: La Paz.[1]																			
Brazil: Porto Alegre	C		1																
Bulgaria	C	15	6	16		4	5	1		1				2	2		2		
	D	1	2	1			1												
China:																			
Manchuria—Harbin (see also table below)	C	52	13	8	2				2				2						
Shanghai	C									1									
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C	1		1	1						1			1	1		1		
Beheira Province	C	2	49	45		5	1	9								1			
	D		13	4		1		1											
Cairo	C								2			5			1				
Port Said	C											4		1				1	
Great Britain: Scotland—																			
Dunfermline	C					1													
Glasgow	C		1																
	D		1																
Greece (see table below).																			
Ireland:																			
Irish Free State—																			
Galway County—Oughterard	C							2											
Kerry County—Dingle	C	5																	
Leitrim County—Mohill	C			9				1											
Mayo County—																			
Ballina	C		2	1		1													
Castlebar	C											1							
Swinford	C		14																
Westport	C						2		1										
Roscommon County—																			
Roscommon	C						1												
Strokestown	C						1												
Wicklow County—Shillelagh	C			4	1		1												
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico:																			
Durango	D															1	1		1
Mexico City, including municipalities in Federal District	C	4	6	9	2		2	1	2	2	2	3	2	2	3				
	D	4	3	1					1	1				1	1				
Morocco	C	15	11	15		4	3	4				8		2					
	D	3																	
Palestine	C	1	2	2	3	1	1	1		1	1	1		1	1	1		1	1
Poland	C	243	171	117		24		12	10	15	2	7	2	3	6	12	3	6	
	D	15	5	11		4			1		1	1		1			1		
Portugal:																			
Lisbon	C	4																	
Oporto	C	1									1								
Rumania	C	186	227	58	11	10	3	4	5		2	2	1					1	1
	D	11	35	5	5	2	1		2										

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930: 5	July 12	July 19	July 26	August, 1930: 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30	September, 1930: 6	Sept. 13	Sept. 20	Sept. 27	October, 1930: 4	Oct. 11
Spain: Valencia	C	------	------	3	------	3	------	------	------	------	------	------	------	------	1	------	------	------	------
	D	------	------	------	------	1	------	------	------	------	------	------	------	------	1	------	------	------	------
Tunisia	C	------	6	18	------	------	14	10	2	5	------	3	1	1	------	4	1	1	1
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P	------	------	------	------	------
Natal	C	P	P	P	P	P	P	1	P	P	P	------	------	------	------	------	------	------	------
Orange Free State	C	------	P	P	P	P	P	P	P	P	P	P	P	------	------	------	------	------	------
Transvaal	C	P	------	------	------	------	P	------	P	P	P	------	P	------	------	------	------	------	------
Yugoslavia (see table below).																			

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
China: Harbin (see also table above)	C	37	204	240	------	14	5
Chosen: Seoul	C	------	3	43	2	3	2
Czecholsovakia	C	42	29	12	1	------	1
Greece: Athens	C	3	1	3	3	6	6
Latvia	C	------	------	3	3	3	------
Lithuania	C	62	73	27	16	18	------
	D	4	4	------	------	------	------
Turkey	C	1	3	16	2	------	2
Yugoslavia	C	46	22	16	6	------	------
	D	2	4	1	------	------	------

YELLOW FEVER

	Cases
Brazil:	
Mage, on theLeopoldina Ry., between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

VOL. 45 NOVEMBER 7, 1930 NO. 45

SPECIAL SESSION OF THE PERMANENT COMMITTEE OF THE INTERNATIONAL OFFICE OF PUBLIC HYGIENE, MAY, 1930

The permanent committee of the International Office of Public Hygiene held its special 1930 session from May 12 to 21, in Paris.

Those present were Messrs. Velghe (Belgium), president; Hamel (Germany); Van Campenhout (Belgian Congo); Shahin Pacha (Egypt) Hugh S. Cumming (United States of America); Barrère (France); L. Raynaud (Algeria); Boyé (French Equatorial Africa); Gaston Joseph (French West Africa); Lasnet (French Indo-China); L'Herminier (Madagascar); G. S. Buchanan (Great Britain); J. D. Graham (British India); McCallum (Australia); H. B. Jeffs (Canada); S. P. James (New Zealand); P. G. Stock (Union of South Africa); Boyd Barrett (Irish Free State); P. Copanaris (Greece); A. Lutrario (Italy); S. Kusama (Japan); Colombani (Morocco); de la Torre (Mexico); F. Roussel-Despierres (Monaco); K. W. Wefring (Norway); N. M. Josephus Jitta (Netherlands); W. de Vogel (Netherland East Indies); Djavad Achtiany (Persia); Ricardo Jorge (Portugal); Ionesco Mihaesti (Rumania); C. Kling (Sweden); H. Carrière (Switzerland); L. Prochazka (Czechoslovakia); de Navailles (Tunis); Hussameddin (Turkey); Syssine (Union of Socialist Soviet Republics); and Messrs. Abt, director of the International Office of Public Hygiene, and Marignac, assistant director.

There were also present at the meetings of the committee, or at certain of them, Dr. L. Rajchman, medical director of the health section of the League of Nations; Doctor Garsaux, medical expert of the International Commission on Air Navigation, Mr. E. W. Travis, vice president, and captain of the ship *Pelle-Desforges*, member of the Committee on the International Signal Code.

I

The committee proceeded to the triennial appointment of nine members of the health committee of the League of Nations, in conformance with the statutes of the health organization of the League.

It examined the resolutions adopted at the fifteenth session of the health committee, held in Geneva from March 5 to 8, 1930, and it heard the statement of the primary results of the proceedings and consultations held last year for the collaboration of the League of Nations with the National Government of the Republic of China in health matters.

In execution of articles 8 and 10 of the opium convention of Geneva of 1925, and on the report of the opium commission, based on the previous advice of expert pharmacologists whose agreement it had secured in this matter, the committee gave its opinion of those preparations which the Governments propose to exempt from the application of the convention, and those which it seems, on the contrary, should be subjected to it. These last are as follows: The salts of eucodal, of dicodide, of dilaudide, and of the "esters" of morphine (these substances themselves being already placed under control as provided by the convention). The decision on "acedicone" was reserved.

II

One of the most important objects of the session was the preparation of a preliminary draft of provisions relative to the sanitary control of air navigation.

The commission recently formed by the committee, in October, 1929, to examine whether and under what form the principles already considered by the International Office of Public Hygiene, following its first studies on the question, might serve as a basis for international agreements, met in the interval between the two plenary sessions. It agreed upon the opportunity for establishing a concrete plan for the regulation of the sanitary control of airplanes and designated as its reporters in the matter Doctor Lutrario, delegate from Italy, and M. de Navailles, delegate from Tunis. If the continual progress in air navigation might seem at first incompatible with the establishment of such regulations and to make preferable general forms, more elastic and easily adapted to the requirements of the moment, on the other hand the desire not to give way to arbitrariness led to fixing, as much as possible, the maximum of measures applicable in each important practical situation.

The committee agreed with this point of view and—according to the principle which has never ceased to dominate its action as well as that of the different international sanitary conferences in the matter of sanitary maritime or land defense—it exerted itself, in the discussion of the proposals of its commission, to admit no measure which was not strictly indispensable to the legitimate protection of the public health.

The first draft of international provisions thus established has been submitted to the Governments affiliated with the International Office of Public Hygiene. The study will be taken up later on the basis of the observations presented.

III

The revision, at present in progress, of the international signal code was the occasion for an adjustment of different questions whose solution assumes the use of the code:

1. It is a question, first, of quarantine signals by day (flags) and by night (lights), which ships desiring to signal their sanitary condition should raise or require to be raised on their arrival in port. These signals have been studied at different times by the International Office of Public Hygiene. Finally, its proposals served as a basis for the selection, by the International Conference on Radiotelegraphy, at Washington, of certain flags for the three quarantine signals by day included in the new code. For the night signals, however, difficulties arose from the fact of possible confusion with the navigation lights. The committee, on the proposal of the British Government and in agreement with the committee on the revision of the signal code, has retained only one signal for a night quarantine signal on ships—a white light surmounted by a red light, having the meaning "I do not have a free pratique" and able to be seen only within the limits of the port.

2. The form of international quarantine radiotelegraphic message adopted by the committee in its preceding session of October, 1929, has been slightly modified to permit of its transmission in code. Some provisional symbols have been set aside for the different classifications, but the definite composition will not be known for several months. Only after the next session of the committee will it be able to send to the governments the form with the information which it contains for facilitating quarantine operations, and consequently hastening the granting of a free pratique.

3. The new international signal code includes a general medical section with a system for the establishment of diagnoses for medical consultations at sea. The opinion of the committee of the International Office of Public Hygiene had already been requested on this section, which it had approved in principle. At the request of the committee on the international signal code, it took up the examination more in detail, and did not consider it necessary to suggest any modification or addition, deeming the whole as well as the different parts of the plan which was submitted to it well adapted to its purpose.

IV

In so far as concerns the other questions, referring more or less directly to the application of the International Sanitary Convention of 1926, the discussion of which was entered upon or undertaken by the quarantine commission, then in plenary assembly of the committee, the following points may be especially mentioned:

1. The first official edition of the International Sanitary Maritime Annual has appeared. It contains information relative to 41 countries and is a volume of about 700 pages. An English edition is in preparation.

2. The steps undertaken, on the invitation of the French Government and with its assistance, for concluding agreements between countries interested either in the abolition of bills of health or at least of the consular visas, have already received important support and seem to be making good progress.

3. The application of article 28 of the convention (periodic deratization of ships) continues to raise numerous questions of a particular nature or of principle. For the solution of the former, according to the rule which it has considered the best and most efficient in all respects, the committee has referred them to the delegates of the interested Governments.

In some countries the regulations in force are still founded on conventions preceding that of 1926. It has insisted that the Governments of these countries, even before ratifying the new convention, take into account its provisions with a view to the regulations to be prescribed in their ports.

In a general way, the experience acquired from the beginning of the functioning of the system established by article 28 is favorable. The progressive decrease in the number of rats on board ships is expressed in the ever increasing number of cases in which (for example, in Great Britain) it has been possible to issue certificates of exemption to ships of different countries. The development of rat-proofing can only further the progress thus made.

To facilitate, as much as possible, ships carrying out their obligations it is extremely desirable that all countries adopt for their certificates (of deratization or of exemption) a sufficiently uniform form so that the information thereon may always be clearly comprehensible to the sanitary authorities of the ports. The Office should, then, insist that the Governments which have not yet placed in force a form similar to the model established by it several years ago [1] adopt this model in its most suitable form. Although this uniform presentation would render the differences in languages less annoying, the certificates should always be in two languages—that of the country of origin and either English or French.

The committee considers it impossible to allow a certificate of periodic deratization (or of exemption) to be issued in a nonqualified port—that is to say, one not having been reported to the International Office of Public Hygiene. However, it believes that a ship finding itself in such a port could be authorized, on its express request, to resort to the services of a qualified neighboring port, whose personnel and material would then be sent to the place and whose sanitary authority would sign the certificate under his own responsibility. But it is evident that a pratique of this kind can only be exceptional

[1] See *Bulletin of the International Office of Public Hygiene*, Vol. XX, 1928, p. 295.

and that ships should, in principle, always select, in conforming to article 28 of the convention, qualified ports at which to call.

As to the question of the process to be employed in the periodic deratization, the opinion of the committee, which has been several times expressed, remains unchanged; it is of the same opinion as to the impossibility, according to the terms and the spirit of article 28 of the convention, of subjecting to periodic deratization a ship to which a certificate has been presented whose duration of validity of six months (eventually seven) has not expired. But, naturally, if the rats multiply quickly on board such a ship, to the point of constituting a serious sanitary risk, the authority of the port always has, on his own responsibility, the right to require that the danger be immediately combated. He should then immediately notify the authority of the port where the certificate was issued, and at the same time communicate in writing to the captain the reasons which rendered the inspection and deratization necessary.

4. In order to avoid the delays with which the sanitary passports issued to persons having landed in a port of another country and subject to "surveillance" are sometimes transmitted to the authorities of the place of destination, the immediate transmission of these passports to the consuls of the countries of destination seems extremely expedient. This system has been adopted as compulsory by the French sanitary administration on the initiative of the Office, and went into force May 1, 1930, for countries which have made or will make the request. To further this practice the delegates of the countries affiliated with the International Office of Public Hygiene have been asked to call the attention of their respective Governments to the advantages and interest of extending it to their own ports.

5. New documents have been received, from Governments as well as associations of shipowners and groups of persons interested in the investigation relative to ships' doctors. The result was a confirmation of the general tendency to require of these doctors a high professional ability and special studies. There was agreement in not desiring them to be functionaries or giving them any of the attributes normally belonging to the sanitary authorities of the ports. A system was organized in Belgium according to which the ships' doctors (if they are considered worthy) receive a commission and are thus invested with a standing which lends confidence to their declarations and facilitates the obtaining of a free pratique for the ships to which they are attached. The Belgian Government has recently extended these facilities to foreign ships whose doctors have, likewise, been commissioned by their respective Governments. It will also support the proposal to provide an international commission on a similar basis.

6. The commission on pilgrimage met to examine provisionally certain points concerning the pilgrims coming from British India and Persia. A more comprehensive discussion of these questions will be had next October, when the commission will be in possession of all the information regarding the pilgrimage of the year. There will also be examined at the next meeting the replies received on the subject of a uniform passport for pilgrims, which were forwarded from the interested administrations in conformance with the provisions adopted in October, 1929.

V

The committee was informed of the studies on plague made in British India under the auspices of the Government or under the direction of the public-health directors of the Provinces. At the Haffkine Institute of Bombay, they are engaged in improving the antiplague serum and vaccine; it was shown that plague is transmitted experimentally from rat to rat by the flea *Xenopsylla astia* about as easily as by *X. cheopis*, and that the transmission can also be carried on by *X. brasiliensis*. The phenomenon of blockage of the proventricle has not been observed as clearly and as regularly in the Bombay experiments as in the original experiment. In the United Provinces they have been studying the method of conservation of the virus between two plague seasons. Nothing decisive has been discovered in favor of the hypothesis of its conservation in man (healthy carrier) or in the rat in the form of chronic plague. The probability would rather point to the existence of a series of acute cases in a rat population which is diminished in number and carrying a reduced number of fleas. In the Madras Presidency researches have been made as to the geographic distribution of the species of *Xenopsylla*. *X. astia* predominates here, but *X. cheopis* is found in all regions of high endemicity. *X. brasiliensis* is the principal flea at Hosur, which is strongly affected by plague; however, some *X. cheopis* are found here. *X. astia* is, on the whole, the indigenous flea; *X. cheopis* is an imported flea, which seems implanted in certain regions, either because it persists here, or on account of frequent importations. Wheat, rice, and cotton play an important part in these importations. At Rangoon *X. astia* is also the principal flea; it breeds especially in February and is least abundant in August. It is in August, on the contrary, that *X. cheopis* are found in greatest numbers (17.2 per cent of the total fleas). The two most frequent rats are *Mus concolor* and *Nesokia bandicota*. *X. cheopis* forms 25 per cent of the fleas on the former, and 2.5 per cent on the latter.

A very thorough study of the insects and the larvæ likely to transmit plague, especially in grain storehouses, has been made in Italy; it aims at explaining plague epidemics in which plague-infested rats

are not found. In Senegal there exist two limited zones of plague endemicity in which the cultivation of the peanut and millet furnish abundant food for the rats. A commission has been working for 18 months to identify the species of rats and fleas. As to the former, *Mus rufinus* and *Golunda campanæ* predominate. The fleas are *X. cheopis* in the proportion of 95 per cent, the remainder being *X. astia.* The periodic outbreaks of plague, which occur in the hot season, are not sufficiently explained by the rôle of rats and fleas; there seems to exist another reservoir of virus than the rat and perhaps another biting insect than the flea.

A slight epidemic of pulmonary plague, which lasted five weeks, occurred in the U. S. S. R. (Union of Socialist Soviet Republics) in a group of villages near Chinese Turkestan; the infection appeared to have come from a local species of hare. Antiplague vaccination is extensively practiced in the Greek ports, with good results; the crews of sailors and laborers working in places exposed to the infection are revaccinated every six months.

The method of estimating the number of rats on board ships, according to the amount and appearance of the dung has been specified and applied with excellent results at Liverpool. A new model of rat guard, of very simple construction, has been devised at Marseille.

The inquiry carried on for two years on the conditions of the appearance of cholera in the United Provinces of British India has concluded that the epidemic outbreaks have almost always an imported case of cholera as a starting point, rarely a convalescent case, and more rarely still a person in the incubation period of cholera. No analyzed epidemic had as its origin a healthy carrier who had harbored choleric vibrios for two months. The laboratories established in the seriously attacked villages each year have not discovered a single healthy carrier in the population of these villages. No rôle in the genesis of cholera has been found to be attributable to the nonagglutinating vibrios. In the Province of Bihar and Orissa it is also after the arrival of convalescents coming from active foci that cholera breaks out. In about 1,500 samples of stools, agglutinating vibrios were found 36 times, always in persons in direct contact with cases of cholera; the carrier condition was of short duration in the convalescents as well as in the contacts. In this Province, in the course of two years of inquiry, agglutinating vibrios have, however, been discovered in 8 persons, 6 of whom were children, who had had no contact with a cholera focus; but the presence of these vibrios could not be ascertained a second time, at least in the first 5, who remained under observation from 2 to 15 months; no explanation could be given for these facts. In Bengal the agglutination of the choleric vibrio was studied and it was concluded that the agglutinability and virulence

might disappear rapidly after the microbe had left the human intestine; they could be resuscitated by penetrating again into the human body or the intestine of a rabbit.

The Indian Research Fund Association has endowed a campaign of work on bacteriophages. For cholera the researches have ascertained that three types of bacteriophages exist, and that vibrios resistant to two of these types were destroyed by the third. The type which is active toward the greatest number of vibrios is not stable and difficult to cultivate; the more stable species of this type attack only 30 per cent of the stock of vibrios studied. The preventive and therapeutic use of the bacteriophage should not, then, give complete results unless a mixture of appropriate species of the three types is made. In application, the addition of bacteriophage to wells during the religious festival of Puri (Puri Mela) seems to have resulted in a great decrease in the number of cases of cholera; they were one-tenth as numerous as in the sections where the wells were not treated. The therapeutic success in the patients in the hospital at Puri was not convincing, perhaps because the pilgrims from different places were infected by very diverse stocks of vibrios resistant to the bacteriophages employed, and also because the patients were extremely prostrated. On the contrary, at the hospital of the College of Medicine at Patna, the therapeutic results were very good. At Rangoon, where the studies included only 33 certain cases of cholera, no direct relation appeared between the presence of bacteriophage in the intestine of the patients and the cure. The therapeutic action of the species employed was not apparent. The same failure was present in dysentery, Shiga and Flexner type. At Shillong, the Pasteur Institute distributed to doctors in the rural regions mixtures of bacteriophages of cholera and dysentery. These mixtures were used in 457 cases of dysentery or choleric diarrhea and 80 cases of cholera. The effect was very satisfactory for dysentery, in case the bacteriophage was properly administered. For cholera, the mortality was 30 per cent in the cases treated. In three small epidemics in which there were untreated persons, the mortality was 54 per cent in the untreated and 26 per cent in the treated patients.

The year 1930 was marked by one of the largest religious festivals in India, which is held every 12 years, and which brought to Allahabad three and one-half million pilgrims, two and one-half million of whom bathed on the same day, January 29, in the Ganges. Great preparations had been made to assure the distribution of pure water, to ferret out the sick and place them in hospitals, and to increase the vaccinations. Only 168 cases of cholera were treated, and cholera was less frequent in India during the following two months than during the corresponding period of the preceding years.

The hot season of 1929–30 has passed at Rio de Janeiro without the reappearance of yellow fever; the destruction of the *Stegomyia* (*Aëdes*)

carried on with a memorable thoroughness and tenacity, has then put an end to the epidemic of 1929. This last attacked men more than women, whites more than mulattoes, foreigners more than Brazilians; it attacked, mostly, persons having resided in Brazil for less than five years and persons over 15 years of age. The very important discovery that the serum of individuals having suffered an attack, even slight, of yellow fever keeps indefinitely the property of protecting the *Macacus rhesus* against the experimental inoculation of the yellow fever virus opens up the possibility of establishing a chart of the endemic foci of yellow fever. The researches made in southwest Nigeria (Ife, Ibadan, Ilorin), in the extreme north of the country, and in Sierra Leone (Freetown) have shown the value of this method. It will from now on be brought to the attention of the sanitary administrations of the different African colonies menaced by yellow fever. The creation of systems of carrying water by conduits, resulting in the abolition of numerous sheltering places for larvæ, is a very effective measure in the prophylaxis of the disease. Among the sanitary measures undertaken at Dakar the most original is the segregation of the natives, which has made great progress; the Housing Office has constructed cheaply, in a certain quarter, sanitary houses and offered them on credit to natives, who buy them and sell the land which they have occupied around the city to Europeans.

The commission on smallpox and antismallpox vaccination, created in May, 1929, presented a report to the committee, with regard to three questions:

1. The definition of the terms variola major, varioloid, and variola minor or alastrim. Varioloid, a typical form of variola major, was clearly separated from variola minor, epidemics of which develop, generally, entirely independently of those of variola major. It specified that variola minor should be subjected to the same administrative and prophylactic measures as variola major, the responsible authorities of a country retaining, however, the right to modify the severity of these measures when in the course of a characteristic epidemic an excessive severity would be considered unreasonable.

2. The present situation in regard to postvaccinal encephalitis. The information collected directly from the delegates of the interested countries establishes the frequency of the affection during the last few years in England and Holland, the countries most affected; in Germany, Austria, Sweden, and Norway, where cases have been present in fairly large numbers; in France and the United States, where they are rare; in the Union of South Africa, Yugoslavia, the U. S. S. R., Italy, Poland, Portugal, and Switzerland, where they are extremely rare, or have not been reported recently. The information received is entirely negative for Belgium, Spain, Greece, Rumania, Canada,

Egypt, Morocco, the Sudan, British India, French Indo-China, Japan, Australia, New Zealand, Central America, and South America, in spite of the very large numbers of vaccinations made in many of these countries. The present report contents itself with presenting known facts, in bringing to light the influence which the habits of different countries in regard to vaccination might have on the frequency of encephalitis. It brings out, moreover, the similarity, reported by the English and Dutch authors, in the anatomopathologic lesions of postvaccinal encephalitis and other forms of encephalitis following an acute infection (measles, chicken pox, smallpox, whooping cough, etc.).

3. The technique of antismallpox vaccination. The replies sent by 23 countries to the questionnaire of the Office bearing on the process of inocculating the vaccine, the number, the length, and the respective distances of insertions and the virulence and dilution of the lymph have been grouped in a comparative statement. The collected information, while bringing to light interesting suggestions, has made apparent the insufficiency of our present knowledge on the fundamental question: What relation is there between the number and extent of incisions, on the one hand, the intensity of the local and general reaction and the degree and duration of the obtained immunity on the other? The commission proposed to submit these problems to experimental study, with all the cooperation of which the committee can be assured in suitable environments. It has traced, on a large scale, the program of the study, which includes also the question of whether it would not be suitable to employ exclusively lymphs the virulence of which does not greatly exceed the limit of 1/1,000, and has proclaimed the use which these researches would serve in developing a laboratory method capable of telling immediately after a vaccination the degree of immunity produced. The committee has already taken account of the observations collected, especially in England, on the influence of the decrease in the number of scarifications and of the dilution of the lymph, and in Sweden on the results of vaccination with a single scarification in the army.

As to smallpox, communications have been presented to the committee on the epidemics of smallpox in France in 1926 and 1927, and the plan for regulation of vaccination to which they gave rise; on the extent of the disease and vaccinations made in the French colonies in 1928; on the progress in Great Britain of the epidemic of variola minor, which left, little by little, the northeast section and the Provinces and increased in the county of London; on postvaccinal encephalitis in Norway, Switzerland, the U. S. S. R., and Yugoslavia; on the limits of the period of immunity of those afflicted with smallpox and those vaccinated with regard to vaccine; on a case of persistent contamination of a vaccine stock by the virus of aphthous fever; and on the administrative measures concerning smallpox

and vaccination in Italy and Egypt, information which completes the publication already issued by the Office for a group of other countries.

Vaccination against tuberculosis by the B. C. G., by subcutaneous injection, has continued to give very favorable results in the nurses at Oslo; tuberculosis has, up to the present time, been reported ten times less frequently among the vaccinated than among the non-vaccinated.

The League of Red Cross Societies has communicated to the committee of the Office, as a first result of an extensive investigation which it undertook at the committee's suggestion, a report of the communal bureau of hygiene of the city of Milan on the condition of the feminine personnel in a large rubber factory with regard to tuberculosis. A minute study has revealed that, in this factory, 15 per cent of the women were or had been more or less affected by tuberculosis, and 12 per cent presented clear, active, or cicatricular lesions. The special conditions at the factory under consideration did not seem to have any unfavorable influence on the death rate. Contamination in the factory could occur only in exceptional instances due to the rarity of persons disseminating bacilli. Three-quarters of the women known to be attacked did regular and good work; the other quarter, whose lesions were more active, were often held up by the disease, and their work was mediocre. This part of the personnel will evidently need medical assistance and a system of special work.

The information collected by the Office on the efforts in different countries to combat tuberculosis in industry and to assure appropriate work to cured or arrested tuberculous persons has been increased by several contributions. In the Netherlands they describe the attempts at readaptation of tuberculous persons in industry, in ordinary sanitariums, and in a special sanitarium workroom; in France, the complete antituberculosis organization which consists of two associations, and the agreement which a certain number of important enterprises have made with the antituberculosis dispensaries; in the United States, the different institutions for work created for the tuberculous, such as the industrial and agricultural camps and colonies, the convalescent workrooms, institutions whose medical result is always reported as excellent, but whose success from an economic point of view is sometimes difficult to guarantee.

The outlines presented to the committee on the extent of tuberculosis in the native races in Morocco and Algeria have shown the importance of this subject, which should receive attention. Finally, the question of the connection of tuberculosis with certain industrial dusts has been raised; there has been especially reported the harmful character of the dust of amianth (asbestos) observed in England,

and the great improvement brought about in the United States by the modification of the machines and the methods of work relating to the dusts of cement, granite, and cotton.

Typhus exanthematicus has decreased greatly in the U. S. S. R., the annual morbidity having fallen from about 250,000 in 1923, to about 30,000 in the last few years. It has almost disappeared from the urban and industrial centers. It persists especially in the rural zones of the north and northwest, center, and west. The activity of the sanitary authorities is shown by the development, in endemic regions, of public baths and disinfecting stations for the control of workers engaging in certain occupations. The large number of positive Weil-Felix reactions among the acquaintances of the patients was noted. In sub-Carpathian Russia, a part of Czechoslovakia greatly affected by typhus several years ago, there remain only sporadic cases; the fight led by a moving column comprising a disinfecting apparatus, a laboratory, and a chance organization for hospitalization has been eminently successful.

During the last session of the committee cases of exanthematic fever were reported in Portugal and in Spain. Attention was called to the gaps which exist in our knowledge of this complex group of fevers, at the same time resembling and differing from typhus exanthematicus. It appears to stand out from the contributions on the study of the subject which have been brought to the present session (France, Great Britain, Portugal, Morocco, United States, British India) and from the discussions to which they gave rise that one can hardly base a definite classification of these affections on the nature of the transmitting agent (louse, tick, acarus, unknown host) or on the result of the Weil-Felix reaction (often inconstant, or slightly positive, or limited to certain strains of *Proteus*). In our present ignorance of the pathogenic agents, one can only define several groups. Next to typhus exanthematicus from lice, are placed the more benign forms of the very closely allied affection which does not seem to be transmitted by the louse—Brill's disease, typhus of the southeastern United States, Mexican typhus, urban typhus (shoptyphus) of the Malay States, and Palestine typhus. A group allied with the preceding has as its characteristic prevalence in rural communities, especially in bushy or grassy regions—rural typhus of the Malay States (badly kept plantations), Mosmann fever in Queensland (sugarcane fields). The transmitting agent is not known with certainty in the first case, and is probably an acarus of the genus *Trombicula* in the second. The exanthematic fever observed recently at Toulon in the crews of the large vessels of the Navy seems little different from this group and is probably transmitted by an acaridan parasite of the rat, *Dermanyssus muris*. The exanthematic fever called "Marseille fever" is probably the type of another group,

characterized by the slough which is produced at the place of entry, adenitis, and sometimes lymphangitis, the papulous form of eruption, whence the proposed name "escharonodular fever." The tick, especially a common dog tick, *Rhipicephalus sanguineus*, is probably most often the inoculating agent. The disease is now considered as identical with macular fever of Tunis. The tick fever of British India (Megaw) seems very close, as does the 10-day fever of Rhodesia (Ross), the tick-bite fever of Sant' Anna and of Nuttal (Lourenço Marquès). Japanese fluvial fever has clinical characteristics similar to those of escharonodular fever (with a more abundant eruption), but is transmitted by an acaridan parasite of a field mouse, *Trombicula akamushi*. It is, like the tick fever of British India, a disease which is contracted in bushy regions. The pseudo-typhus of Sumatra, transmitted by the larvæ of different *Trombicula*, does not seem to be distinctive. Finally, the tick fever of the Rocky Mountains, transmitted by ticks, has different important characteristics—purpuric eruption, abundant desquamation, inoculability in the guinea pig, sometimes high mortality.

Undulant fever has caused a slightly higher number of cases in Great Britain than was thought. It has just been reported from Yugoslavia. In Sweden on an average of 2 to 3 cases per week are counted on. In Switzerland, where 20 per cent of the cattle taken to the slaughterhouse are infected with the Bang bacillus, there were discovered 37 human cases of Bang bacillus fever, of which 2 cases were laboratory infections. There was noted one case in which hypertrophy of the spleen gave rise to the diagnosis of lymphogranulomatosis and caused the excision of the spleen; and one case in which repeated abortions seemed to be in agreement with the presence of the Bang bacillus in the secretions of the neck of the uterus.

Tularaemia, a disease recognized only in the United States for several years, is now known in the U. S. S. R., in Norway, and Japan. Characterized by general symptoms of infection, especially axillary adenitis and usually an ulceration, with clear-cut edges, at the point of inoculation, it is contracted either by contact with infected wild rodents, or by the bite of ticks or biting flies. In the United States, where wild rabbits are the principal source of the virus, 420 cases have been reported; but this number is far from representing the real total. Human cases have been observed in 37 States and the District of Columbia. In the U. S. S. R., in the lower Volga basin and in the basin of its tributary the Oka, in the Province of Ouralsk, region of Tobolsk, epidemics of adenitis were reported in 1877, then in 1921, and especially in 1926 and 1928. In the villages a large proportion of the population was affected, some having up to 800 persons attacked. Considered at the beginning as benign plague, the disease was identified, directly and retrospectively, by the exchange of serums

of patients and cultures with the laboratory of the United States Public Health Service. It had as an origin the hunt for water rats (*Arvicola amphibius* L.), which are greatly infected with *B. tularense.* In Norway, 12 cases of tularaemia were recently identified in persons infected by rabbits. The number of cases which might be suspected according to the clinical list, but for which a serological examination was not made, is much higher. The disease is perhaps identical with one of the forms of "lemming fever."

Can psittacosis be transmitted from person to person? In England, in three instances, patients had not been in contact with an infected person until after the death of the parrot; contamination by objects infected by the parrot can not, however, be absolutely discarded. In the United States, where 158 cases of the disease were recognized, among 11 persons attacked during the course of researches in the Public Health Service at Washington, only 2 had been in contact with infected birds. In Switzerland, several members of the family of a patient were infected by the patient; the parrot was in another house. In Germany, where 156 cases of psittacosis were reported, the disease attacked, in at least four instances, a series of persons, some of whom had no contact with parrots and had not even entered the house where the sick birds were kept. In two other series the diagnosis of psittacosis was less certain. There is especially to be noted five cases in doctors, nurses, and persons caring for patients. The presence of the virus in filtered products was established in the United States, England, and Germany; there were also seen in the lesions, organisms of small coccoid or bacilliform formation (United States, Germany). A bacillus of the paratyphus group was isolated at Dresden. The virus is present in the fecal material of the birds.

Poliomyelitis increased appreciably in the Netherlands in 1929—507 cases instead of the usual average of 60, attacking especially the age group from 0 to 4 years. The epidemic was combated by the organization of neurological clinical assistance, the distribution of convalescent serum, hospitalization, as often as possible, at the expense of the State, and making available facilities for hydrotherapic and electrotherapic treatments following the acute period. In Rumania, following the epidemics of 1927 and 1928, there were only about 60 cases in 1929. The specific serum prepared from the horse was used; but it is difficult to draw conclusions as to its efficacy, because of the great differences in severity among the cases treated.

The activity of the public health services in Italy has resulted in a great improvement in the general health; the decrease in the frequency of contagious diseases, especially the so-called social diseases, is remarkable; from 1887 to 1927 the death rate from contagious diseases fell from 6.80 per 1,000 to 1.92, which means more than 123,000 human lives saved per year; for tuberculosis the rate has fallen from

2,114 to 1,337 per million; for malaria from 710 to 63; pellagra has almost disappeared. In Java the death rate for three large towns is much higher than the average rate for the island and for the rural population. It has fallen, however, from 46.55 per 1,000 during the period 1912 to 1923, to 29.39 per 1,000 in 1929. The cause of this high mortality was principally malaria, through the decrease in resistance to intervening diseases which it caused. Malaria was maintained especially by the multiplication of the larvæ of *Myzomia rossii* Giles in the salt waters of the pools and fishponds which border the sea near these towns. The destruction of floating algæ, carried on by two different processes, brought about a radical change in the degree of infection of the population, without injuring the raising of fish, an important source of revenue.

A great deal has been accomplished in regard to natality and mortality among the native tribes in the French colonies of Africa, Asia, America, and the Indian and Pacific Oceans, and it should serve as a base, in the future, both for the study of the influence of certain traditional customs on the demographic condition of these peoples—early marriage, polygamy, migration of laborers, for example—and in ascertaining the effects of the measures of sanitary protection.

A serious accident, which occurred to a group of passengers on a ship bound for Rotterdam, has given rise to the idea that precautions relative to the transportation and storage of ferrosilicium should be the object of an investigation, and perhaps finally of an international agreement. The note in which this question was brought to the committee will be sent to the different countries through their respective delegates, and the opinion of the countries will be requested on a series of measures concerning points on which the regulations at present in force differ.

Finally, the committee heard communications on the following various subjects:

The cerebrospinal meningitis epidemic which prevailed in Turkey, at Tarsas, during the seasonal period of two consecutive years, and the constant increase in the frequency of cerebrospinal meningitis in the United States; the encephalitis epidemic, differing from lethargic encephalitis, which presented in 1929 in Japan the same characteristics as in 1924 and 1926, striking in the same sections, after a period of excessive heat and drought, the aged and then the children rather than the adults; the march across Africa of recurrent lice fever which, starting from the banks of the Niger in 1921–22, reached, in 1928, the Anglo-Egyptian territory, attacking or respecting the peoples which it encountered according to whether their clothing offered possibilities of harboring lice; the success of the prophylaxis of trypanosomiasis in French Equatorial Africa, based on administrative action (destruction of tse-tse flies, removal of villages) and medical

action (creation of centers for the natives in which there is systematically carried on a series of injections of atoxyl) and, since 1929, the creation of 58 centers of treatment where the patients stop and receive, according to their needs, injections of atoxyl, tryparasamide, or other special medicines; the seriousness of measles in Egypt, where the mortality is as high as 40–45 per 100, and where it is ten times more fatal than diphtheria, and about two thousand times more fatal than smallpox and scarlet fever; the researches systematically carried on in Greece for three years to enumerate the persons attacked by leprosy, so as to group them and treat them in four antileprosy stations, and the discovery of a small family focus of leprosy in Yugoslavia; the revival of dengue toward the end of 1929 in Smyrna, where the disease was present at the end of 1928; the epidemics of scarlet fever in several provinces of Turkey in 1929, and the encouraging results given by antistreptococcic vaccination (about 19,000 vaccinations of four injections and 8,000 of three injections) as well as serotherapy applied to the hypertoxic forms in the first stages of the disease; the inquiry made by the ministers of public works and public hygiene of Czechoslovakia on the frequency of pulmonary cancer among the personnel employed in the extraction of radium at Joachimsthal, where this disease seemed to cause a very large proportion of deaths, and the different measures of proposed protection; the results of the survey of a population of 24,500,000 in the United States to determine the number of cases of syphilis and gonorrhea under treatment on a certain day, and which set an estimate of 211,000 recent cases of syphilis and 248,000 recent cases of gonorrhea in the United States, and showed higher figures for the black race than the white (for syphilis only), for the large cities than the rural sections, and for the Navy than for the Army.

NOTE ON AN OUTBREAK OF ENCEPHALITIS IN NEW ALBANY, IND.

Information has been received from the Indiana State Board of Health that 21 deaths from encephalitis were reported in New Albany, Ind., during the period September 1–15, 1930. The number of cases is not known.

The State health department obtained from physicians case records in 10 of the fatal cases and 6 of the recovered cases. The ages in the fatal group ranged from 63 to 76, excepting one colored woman, who was 28. Ninety per cent of the fatal cases were in males. The ages of four of those who recovered ranged between 11 and 50 years, while one was 67 and another 75 years of age. There was no history of contact, excepting in the case of one patient who had visited his brother ill with the disease, both of whom died.

The onset of the symptoms was sudden and characterized by high temperature, muscular rigidity, mental impairment, disturbance of sensation, motion, and vision, with diplopia in one case, herpes in two cases, and hiccough in six cases. Lethargy was a prominent but by no means constant symptom. Insomnia prevailed in a number of cases. Some of the patients finally became comatose. No effort was made to isolate Pfeiffer's bacillus. There was no previous infection, except a few cases of chronic nephritis and endocarditis. Some spinal punctures were made, with negative results.

It was the opinion of the physicians interviewed that the encephalitis was due to influenza of the nervous type attacking the central nervous system.

COMPARATIVE CURRENT STATE MORTALITY STATISTICS [1]

In this, as in the preceding report on current mortality statistics, the plan of publication has been changed from a monthly basis to the presentation of rates for a period including as many months of the current calendar year as are available, with comparative rates for the same period in the three preceding calendar years where data are available for those years. In the present report, figures are given for the 8-month period from January to August of 1930 for a number of the States, but for others the period is shorter. In the instance of many of the causes of death included in this report there is little seasonal variation and monthly rates seem unnecessary. It is believed that these rates for the "year-to-date" for each State with comparative rates for corresponding periods in preceding years will be more useful than monthly rates.

The rates are computed from current and generally preliminary reports furnished by State departments of health. Because of (*a*) some lack of uniformity in the method of classifying deaths according to cause, (*b*) some delayed death certificates, and (*c*) various other reasons, these preliminary rates can not be expected to agree in all instances with final rates published by the Bureau of the Census, which are based on a complete review and retabulation of the individual death certificates from each State. The preliminary rates given in the accompanying table are intended to serve as a current index of mortality until final figures are issued by the Bureau of the Census.

Populations used in computing rates are as of July 1 of each year, based on the 1920 Census and provisional results of the 1930 Census. Rates for 1930 and comparative years have been recomputed on new population estimates.

[1] From the Office of Statistical Investigations, United States Public Health Service.

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Death rates from certain causes in stated periods of 1930, with comparative data for corresponding periods in preceding years

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births			Rates per 100,000 population (annual basis)																					
				Infant mortality	All except malformations and early infancy	Maternal mortality (143-150)	Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31-37)	Cancer, all forms (43-49)	Diabetes (57)	Diseases of the nervous system (70-86)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87-96)	Diseases of the heart (87-90)	Diseases of the respiratory system (97-107)	Pneumonia, all forms (100-101)	Diseases of the digestive system (108-127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
7 States*	January to August.	1930	7.5	(1)	(1)	(1)	2.3	4.1	1.4	4.1	3.6	15.5	0.4	0.7	3.8	51.2	56.1	11.6	77.9	55.6	144.2	135.5	65.9	54.3	53.7	10.9	56.0
		1929	8.6	(1)	(1)	(1)	2.6	1.4	1.5	5.3	5.1	58.2	.6	.8	4.7	57.5	58.3	11.8	84.8	58.1	161.2	140.3	77.9	68.2	55.5	11.3	59.9
Alabama	do	1930	11.4	76	46	8.0	6.9	3.7	.7	11.2	3.1	37.9	.6	.7	1.6	84.0	50.0	8.5	97.1	62.0	146.6	128.9	103.9	92.8	86.0	29.8	100.3
		1929	12.6	80	50	8.8	7.1	3.1	1.0	10.8	4.4	160.5	1.1	1.1	1.1	83.1	45.9	8.4	96.8	57.1	137.9	128.4	105.7	98.9	101.6	28.6	91.7
		1928	12.1	83	52	8.7	7.6	11.4	.2	7.7	4.4	65.8	.9	(1)	(1)	90.8	47.4	9.0	(1)	57.3	(1)	128.1	(1)	111.3	(1)	34.4	86.7
		1927	10.1	65	36	7.6	10.5	4.9	.7	15.8	4.0	28.3	.8	(1)	(1)	87.6	46.2	7.4	(1)	47.0	(1)	96.5	(1)	62.6	(1)	30.2	72.1
Arizona	January to July	1930	16.2	134	93	5.1	9.0	2.5	2.0	11.8	8.0	20.0	2.0	.4	24.4	338.1	55.1	6.0	108.2	54.7	168.9	137.4	230.4	186.5	166.1	84.2	56.3
		1929	16.9	139	107	5.6	16.9	(2)	3.6	12.1	2.4	26.5	.8	.8	18.5	417.2	57.5	4.4	98.5	45.8	140.3	127.4	181.3	144.8	188.9	128.2	66.7
California	January to June	1930	11.9	60	29	5.9	1.4	8.6	1.8	3.8	3.6	10.5	1.4	1.1	3.9	108.0	122.2	20.3	114.8	83.3	291.4	248.2	95.1	80.9	78.4	15.1	84.6
		1929	12.6	68	36	5.3	1.5	.3	2.5	6.4	3.0	30.8	.8	1.5	9.8	116.2	117.0	19.4	119.0	83.4	304.1	267.8	109.0	95.0	76.4	10.9	96.1
		1928	12.3	63	34	5.7	1.7	.8	1.0	5.8	6.1	16.8	1.8	1.1	1.9	120.2	119.7	19.2	120.4	84.9	276.8	239.4	99.2	87.6	79.1	13.9	99.9
Connecticut	January to July	1930	11.4	63	(1)	(1)	.5	.1	2.5	2.3	2.9	19.5	1.0	1.2	1.4	63.9	116.7	19.0	(1)	(1)	(1)	193.3	(1)	113.1	(1)	8.7	79.8
		1929	12.1	71	(1)	(1)	.8	5.0	1.3	3.1	3.7	59.6	.3	1.3	1.2	68.5	111.7	17.6	(1)	(1)	(1)	206.3	(1)	134.6	(1)	8.2	78.7
		1928	11.9	68	(1)	(1)	.7	5.9	2.3	7.6	5.5	29.2	.4	1.5	1.0	75.4	106.6	(1)	(1)	(1)	(1)	178.5	(1)	131.4	(1)	5.5	(1)
		1927	11.2	63	(1)	(1)	.8	2.1	1.6	2.9	5.6	25.1	.2	(1)	.8	74.5	105.3	(1)	(1)	(1)	(1)	188.9	(1)	98.4	(1)	9.1	(1)
District of Columbia	January to August.	1930	15.5	70	36	9.6	3.1	.3	2.2	5.8	3.4	7.1	.3	.6	1.5	126.5	135.3	28.6	145.6	101.5	382.2	326.5	146.3	123.9	105.9	16.9	165.0
		1929	15.8	72	36	6.2	3.1	(2)	3.1	5.6	7.1	28.3	.9	.9	2.5	125.3	126.5	28.0	138.3	83.9	381.1	324.5	181.9	158.3	96.3	14.9	170.7
		1928	15.3	(1)	(1)	(1)	1.9	5.0	1.9	3.1	7.5	16.9	1.3	1.3	.9	126.7	126.0	29.4	151.7	106.9	350.2	311.6	171.8	144.5	100.6	15.3	162.7
		1927	15.2	(1)	(1)	(1)	1.6	(2)	.9	3.5	6.3	26.9	.6	1.9	.9	137.3	128.4	22.2	157.0	106.6	336.1	296.5	153.8	129.7	88.2	7.3	179.8
Florida	do	1930	12.4	67	34	9.6	5.0	6.2	.3	4.3	3.5	25.5	.9	.6	.3	70.1	70.6	14.8	129.9	105.9	202.4	176.7	81.2	62.3	92.3	17.9	123.4
Georgia	January to July	1930	12.1	85	(1)	10.2	10.9	6.9	.9	10.3	2.6	43.4	1.1	.3	3.9	76.5	50.6	11.5	131.7	(1)	156.1	141.1	115.3	99.4	85.3	24.0	136.5
		1929	12.0	(1)	(1)	(1)	8.2	1.7	.8	8.2	3.3	132.4	(1)	(1)	(1)	77.8	45.6	9.8	(1)	(1)	(1)	123.0	(1)	88.8	(1)	18.5	132.5

Hawaii	January to August.	1930	10.6	84	(1)	(1)	3.2	6.1	.4	5.3	12.6	7.7	(2)	(2)	2.8	98.5	54.7	12.2	(1)	44.2	(1)	122.4	(1)	123.6	145.5	89.2	(1)
		1929	13.0	107	(1)	(1)	4.2	7.6	(2)	39.0	9.2	23.9	.8	.4	29.4	109.1	60.8	12.2	(1)	54.5	(1)	120.0	(1)	162.4	185.4	114.1	(1)
		1928	11.8	(1)	(1)	(1)	6.9	2.1	1.7	2.1	14.6	18.9	(2)	(2)	4.3	125.8	65.3	6.0	(1)	62.3	(1)	113.5	(1)	161.2	144.4	81.7	(1)
Idaho	do	1930	9.7	44	17	4.8	2.4	1.3	1.7	4.4	3.4	10.1	(1)	(1)	6.7	35.4	59.6	6.1	102.0	68.3	188.5	165.6	127.6	109.8	54.2	1.7	38.0
Illinois	do	1930	(1)	(1)	(1)	(1)	1.5	1.5	4.5	2.1	6.8	12.8	.4	.4	3.0	62.8	(1)	(1)	(1)	(1)	(1)	(1)	(1)	67.8	(1)	(1)	(1)
		1929	(1)	(1)	(1)	(1)	1.3	5.2	4.3	3.4	9.4	46.6	.1	.9	3.8	75.4	(1)	(1)	(1)	(1)	(1)	(1)	(1)	91.0	(1)	(1)	(1)
		1928	(1)	(1)	(1)	(1)	1.6	1.3	2.0	4.2	7.5	(1)	(1)	(1)	3.1	76.6	(1)	(1)	(1)	(1)	(1)	(1)	(1)	105.9	(1)	(1)	(1)
		1927	(1)	(1)	(1)	(1)	1.8	5.9	2.6	4.6	7.9	(1)	(1)	(1)	1.8	80.0	(1)	(1)	(1)	(1)	(1)	(1)	(1)	78.9	(1)	(1)	(1)
Indiana	do	1930	11.9	56	25	6.3	2.3	2.2	2.4	3.8	3.4	20.2	.5	1.1	10.2	68.7	102.7	16.4	(1)	109.6	(1)	190.3	(1)	87.0	(1)	13.9	87.1
		1929	12.6	67	(1)	7.3	2.8	5.5	3.9	6.3	3.8	77.7	.2	.6	1.4	73.5	97.2	14.9	(1)	110.5	(1)	207.9	(1)	106.2	(1)	15.4	82.6
		1928	12.0	64	(1)	5.9	3.0	2.8	2.3	5.1	4.4	48.7	(1)	(1)	(1)	72.5	100.4	(1)	(1)	111.1	(1)	176.7	(1)	103.0	(1)	15.0	80.1
		1927	11.6	59	(1)	7.0	3.3	2.5	2.6	6.4	5.6	29.0	(1)	(1)	(1)	74.8	102.1	(1)	(1)	100.1	(1)	170.7	(1)	79.2	(1)	12.8	83.8
Iowa	January to August.	1930	11.4	56	22	8.0	1.2	12.4	3.5	4.3	1.8	29.6	.9	2.6	3.7	36.6	117.5	23.5	143.8	100.9	261.9	213.9	98.6	86.2	76.2	4.9	45.3
		1929	10.6	55	22	5.9	1.5	1.2	2.4	4.9	1.0	69.2	.7	1.2	2.1	35.7	109.9	18.4	133.5	98.3	252.2	218.9	80.6	66.0	62.7	4.0	51.1
		1928	10.2	58	22	5.6	2.1	(2)	2.0	3.3	2.3	44.4	.4	1.4	1.2	35.7	108.6	18.3	134.6	98.3	235.0	209.0	79.7	69.6	65.2	4.3	54.5
Kansas	January to July.	1930	10.8	56	25	8.1	1.6	6.8	2.8	4.4	3.4	38.9	.5	.4	3.3	38.7	95.2	22.1	131.7	100.5	207.7	178.5	75.3	65.2	70.2	8.9	107.9
		1929	10.9	65	32	7.3	2.2	3.6	4.0	4.7	2.5	75.0	.5	.8	3.3	44.6	91.5	20.9	143.6	114.1	193.2	169.1	79.5	67.8	71.9	7.8	93.4
		1928	11.0	60	29	8.9	1.4	1.6	2.9	5.5	2.3	71.7	.5	1.1	1.1	42.7	95.5	21.3	145.7	111.5	205.7	178.2	81.2	67.2	73.9	10.1	92.8
Louisiana	do	1930	12.2	90	57	10.7	9.6	7.4	.4	6.3	4.8	46.5	2.2	.7	4.9	92.2	65.6	14.0	95.9	64.4	220.6	203.0	114.1	102.7	90.6	24.6	116.6
		1929	12.1	83	55	12.1	9.1	3.7	.5	6.7	4.1	114.5	.6	.4	2.7	92.7	63.4	11.0	90.5	58.1	209.7	193.9	100.4	89.7	90.4	26.9	108.2
		1928	12.3	87	55	12.6	11.3	13.9	.3	10.1	5.1	69.7	.7	1.1	.9	97.6	61.7	12.1	95.0	65.6	191.8	179.8	120.0	108.1	93.4	27.8	114.4
Maryland	January to August.	1930	13.5	69	36	5.5	4.0	.6	2.5	5.2	2.5	12.7	.3	1.3	1.8	108.1	114.0	22.3	145.4	107.6	285.2	248.9	139.0	123.8	83.9	23.6	156.4
Michigan	do	1930	10.9	64	27	6.4	1.3	6.8	3.3	4.1	6.9	13.9	.5	1.0	10.0	64.0	90.9	18.0	120.1	90.8	232.7	194.0	93.2	76.0	78.2	10.1	63.9
		1929	12.3	69	33	6.5	1.5	3.9	3.7	6.2	10.2	50.9	.8	1.3	22.6	70.9	93.0	20.8	136.4	95.1	254.4	222.9	118.4	101.9	83.5	13.0	68.5
Minnesota	January to July.	1930	9.9	45	16	5.1	.8	5.4	1.9	2.9	1.3	17.8	.5	1.3	2.5	49.8	118.1	18.8	107.3	81.3	195.2	177.1	84.0	78.2	67.5	5.1	54.4
		1929	10.5	52	21	4.4	.8	4.5	2.8	5.5	2.4	58.2	.3	2.8	2.3	59.5	110.0	5.3	106.9	79.1	208.2	160.5	85.1	77.6	66.9	3.7	58.7
		1928	10.2	(1)	(1)	(1)	.5	.5	3.1	2.3	2.7	42.4	.4	2.4	1.8	59.5	114.2	21.4	(1)	(1)	(1)	156.1	(1)	77.3	(1)	(1)	59.1
Mississippi	January to June.	1930	11.7	(1)	(1)	(1)	5.4	2.4	.5	10.2	3.4	43.8	.7	(1)	11.4	85.6	47.7	9.7	(1)	71.7	(1)	106.6	(1)	85.3	(1)	9.3	105.4
		1929	12.8	(1)	(1)	(1)	6.5	7.6	(2)	11.2	2.6	193.6	.8	.5	.6	80.8	45.6	6.7	(1)	65.1	(1)	96.5	(1)	80.7	(1)	17.2	93.4
Montana	January to August.	1930	9.6	(1)	(1)	(1)	3.1	3.4	3.4	2.2	.6	24.7	.6	1.7	5.6	65.3	79.0	17.1	95.8	61.7	154.4	139.8	100.0	87.7	79.3	9.2	73.7
Nebraska	January to June.	1930	10.7	49	19	5.2	.7	12.1	3.3	3.7	3.2	23.0	.4	.9	3.3	26.4	106.1	23.9	112.5	88.2	196.5	174.0	93.3	82.2	70.8	4.9	56.6
		1929	10.7	63	32	(1)	1.5	3.1	6.6	3.8	4.0	80.5	.1	1.0	3.5	34.4	95.3	22.9	126.0	94.7	205.5	181.3	93.7	82.4	73.1	5.4	57.6
New Jersey	January to August.	1930	10.9	(1)	(1)	(1)	.9	4.5	1.7	2.4	9.6	9.5	.3	1.0	2.0	72.6	106.5	24.4	110.2	81.9	260.6	235.4	97.6	86.8	71.6	10.2	101.4
		1929	11.8	63	(1)	5.5	6.0	1.1	1.2	5.5	10.7	33.6	.4	1.4	2.5	75.1	107.8	23.5	113.2	83.0	273.9	251.2	133.5	119.1	71.6	9.7	101.7
		1928	11.7	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	15.0	(1)	(1)	(1)	76.0	103.4	(1)	115.9	(1)	255.8	(1)	61.7	76.1	67.7	13.7	105.3
		1927	11.3	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	13.5	(1)	(1)	(1)	78.0	103.4	(1)	123.3	(1)	234.8	(1)	54.8	61.0	65.8	16.2	95.8

* Alabama, District of Columbia, Iowa, Michigan, New Jersey, Tennessee, and Virginia.

[1] Not available.

[2] No deaths.

Death rates from certain causes in stated periods of 1930, with comparative data for corresponding periods in preceding years—Continued

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births: Infant mortality	Rate per 1,000 live births: All except malformations and early infancy	Rate per 1,000 live births: Maternal mortality (143–150)	Rates per 100,000 population (annual basis): Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31–37)	Cancer, all forms (43–49)	Diabetes (57)	Diseases of the nervous system (70–86)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87–96)	Diseases of the heart (87–90)	Diseases of the respiratory system (97–107)	Pneumonia, all forms (100–101)	Diseases of the digestive system (108–127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
New York [3]	January to July	1930	13.0	62	25	6.2	1.0	2.2	1.7	3.9	2.8	13.0	.4	.7	1.3	70.9	125.9	28.9	139.9	107.2	355.9	308.7	115.8	99.8	72.3	7.9	125.4
		1929	14.2	68	29	5.9	1.1	3.7	2.6	1.3	3.3	58.8	.5	1.1	1.2	78.4	125.3	28.3	157.0	120.9	383.5	336.1	148.0	129.6	69.6	8.4	117.2
		1928	13.6	69	29	7.0	1.5	5.1	2.8	4.4	4.7	21.6	.4	1.0	.8	79.9	123.8	25.8	159.5	122.8	366.4	318.8	129.1	114.5	75.4	11.1	115.5
		1927	13.3	67	28	6.3	1.7	4.1	2.3	4.4	4.9	17.2	.3	.8	.2	83.2	124.5	25.8	154.0	115.6	341.3	294.9	218.8	102.7	77.6	12.1	119.5
North Carolina	January to May	1930	12.9	82	(1)	7.5	1.0	.1	1.2	10.6	5.6	45.0	.3	.7	1.1	90.5	(1)	(1)	(1)	(1)	(1)	(1)	(1)	140.2	(1)	17.1	(1)
		1929	13.4	(1)	(1)	(1)	2.4	1.1	2.1	7.9	7.4	170.2	.9	(1)	.5	91.8	(1)	(1)	(1)	(1)	(1)	(1)	(1)	134.9	(1)	14.8	(1)
		1928	11.8	(1)	(1)	(1)	1.9	34.6	1.8	7.9	7.0	55.0	.7	.9	(2)	86.3	(1)	(1)	(1)	(1)	(1)	(1)	(1)	140.7	(1)	13.6	(1)
Ohio	January to June	1930	12.0	60	25	6.5	1.7	5.1	2.8	3.8	3.0	26.0	.5	1.1	2.3	70.8	107.1	23.0	122.9	111.9	273.1	242.6	108.5	96.6	56.2	6.5	84.3
		1929	13.7	(1)	(1)	(1)	1.1	6.3	2.8	10.4	3.3	107.4	.6	(1)	3.3	76.0	103.6	(1)	(1)	116.3	(1)	242.2	(1)	121.8	(1)	6.2	90.2
		1928	12.7	(1)	(1)	(1)	1.1	4.9	2.6	3.2	6.0	51.3	.7	(1)	2.2	79.2	101.7	(1)	(1)	104.4	(1)	(1)	(1)	115.4	(1)	6.4	95.4
Pennsylvania	January to July	1930	11.9	70	36	6.0	1.4	3.2	2.4	4.6	5.5	24.6	.4	1.0	2.4	65.1	96.9	22.7	117.9	87.5	274.7	244.4	125.4	110.3	71.5	13.0	107.1
		1929	13.1	75	40	6.7	1.7	5.7	3.1	6.5	7.3	85.0	.5	1.2	2.4	70.5	101.9	23.2	125.8	91.2	277.3	250.4	147.0	127.6	72.7	13.4	110.3
		1928	12.9	75	40	6.3	1.3	7.4	3.0	4.0	9.9	40.3	.6	1.2	1.1	75.6	99.1	23.2	(1)	94.9	(1)	241.9	(1)	133.4	(1)	17.0	114.6
		1927	12.4	72	37	6.9	2.1	3.5	3.4	5.9	9.0	32.5	(2)	1.2	.4	77.9	96.4	20.3	(1)	91.6	(1)	227.8	(1)	121.4	(1)	17.3	111.1
South Carolina	January to August.	1930	(1)	(1)	(1)	(1)	16.7	.4	.3	13.5	4.5	43.3	1.0	2.8	4.7	78.9	38.5	8.3	(1)	(1)	316.3	(1)	(1)	106.2	(1)	(1)	119.0
		1929	(1)	(1)	(1)	(1)	14.2	.1	.6	14.2	5.4	104.2	.6	2.5	2.4	82.1	42.0	8.8	(1)	(1)	309.0	(1)	(1)	95.0	(1)	(1)	102.4
		1928	(1)	(1)	(1)	(1)	17.3	23.8	.3	12.1	4.6	51.7	1.0	2.9	1.7	88.8	44.2	8.3	(1)	(1)	303.6	(1)	(1)	118.7	(1)	(1)	108.2
		1927	(1)	(1)	(1)	(1)	21.5	3.5	.2	12.8	3.8	20.0	1.3	3.0	1.7	92.6	40.7	7.3	(1)	(1)	295.3	(1)	(1)	108.2	(1)	(1)	96.6
South Dakota	January to May	1930	8.0	59	27	6.9	1.0	5.9	1.4	3.1	1.7	30.4	.3	.3	(2)	41.2	68.4	19.6	81.7	53.1	135.9	112.8	79.6	67.4	53.1	8.4	51.3
		1929	9.5	74	41	6.8	1.4	3.9	3.9	4.6	1.8	102.1	2.5	.7	3.2	54.9	61.9	20.4	90.4	55.6	156.6	139.7	104.5	89.7	66.5	4.9	35.4
		1928	9.0	68	33	4.9	1.8	1.8	3.5	4.6	3.2	53.3	(1)	(1)	(1)	74.2	66.1	19.1	98.2	55.8	140.3	120.8	99.6	84.4	65.0	8.5	41.7
Tennessee	January to August.	1930	11.5	70	41	8.7	9.9	6.9	1.3	6.8	3.4	37.2	.8	.7	12.8	119.5	55.7	10.7	104.4	63.5	136.8	122.1	103.1	92.3	94.2	25.4	78.6
		1929	12.5	85	58	8.1	8.9	.5	1.9	7.8	4.0	144.1	1.2	.7	2.0	128.4	55.7	9.7	98.2	56.6	140.9	130.3	106.7	92.6	78.9	24.8	70.3
		1928	12.0	(1)	(1)	(1)	1.0	11.4	1.3	5.4	3.0	62.4	1.2	.7	.5	128.8	58.5	9.3	(1)	(1)	(1)	121.6	(1)	109.0	(1)	32.1	(1)
		1927	11.4	(1)	(1)	(1)	17.8	5.1	1.5	15.5	3.8	34.7	.7	.5	.5	136.2	(1)	(1)	(1)	(1)	(1)	(1)	(1)	82.4	(1)	30.6	(1)

Virginia	January to August.	1930	12.0	73	(1)	6.9	4.5	5.5	1.2	13.1	3.8	33.0	.9	1.1	3.0	88.9	63.8	14.9	132.0	100.2	207.8	180.2	99.3	86.0	83.8	27.2	109.5
		1929	12.5	79	(1)	7.4	3.9	2.1	.7	11.8	4.2	128.1	1.1	1.2	1.6	95.4	64.5	11.0	128.3	91.1	199.0	180.6	88.2	76.6	74.7	20.9	101.7
West Virginia	January to July.	1930	9.5	(1)	(1)	6.1	6.6	7.0	2.3	14.5	4.1	32.1	.4	.3	1.6	69.2	56.6	12.4	90.2	60.1	149.6	117.2	101.5	93.0	79.8	31.0	58.2
		1929	11.1	(1)	(1)	5.8	8.1	5.9	1.2	12.5	3.2	144.0	.7	.7	1.0	70.4	59.5	9.3	88.1	50.5	163.4	115.8	111.7	93.5	78.5	31.8	75.0
Wisconsin	January to August.	1930	10.4	56	(1)	9.2	.6	4.7	3.5	3.5	2.5	16.1	.5	.9	2.5	53.3	111.4	(1)	(1)	(1)	(1)	(1)	(1)	74.6	(1)	8.0	(1)
		1929	11.1	64	(1)	(1)	1.2	3.3	2.8	4.4	2.4	57.5	.4	1.9	4.7	55.1	106.5	(1)	(1)	(1)	(1)	(1)	(1)	81.3	(1)	11.4	(1)
		1928	(1)	62	(1)	(1)	.7	.5	2.5	2.2	3.3	35.5	.6	1.6	3.4	60.6	(1)	(1)	(1)	(1)	(1)	(1)	(1)	88.2	(1)	12.0	(1)

[1] Not available.

[3] Exclusive of New York City.

PRINCIPAL CAUSES OF DEATH IN THE REGISTRATION AREA, 1929

(Provisional Summary)

The Department of Commerce announces that 1,386,363 deaths occurred in 1929 in the registration area in continental United States, corresponding to a rate of 11.9 per 1,000 population, as compared with 12.1 in 1928.

In 1929 the registration area comprised 46 States, the District of Columbia, and 9 cities in nonregistration States, with an estimated population on July 1, 1929, of 116,275,139, or 95.7 per cent of the total population. In 1928 the registration area included 95.3 per cent of the total population.

The death rate from all causes per 100,000 population decreased from 1,207.1 in 1928 to 1,192.3 in 1929. This net decrease was almost entirely balanced by increases in influenza (from 45.3 to 55.5), diseases of the heart (208.3 to 210.9), and meningococcus meningitis (2.6 to 4.5). Deaths from these three diseases alone caused 21.2 per cent of all deaths in 1928 and 22.7 per cent in 1929.

Among the epidemic and endemic diseases listed in this summary, seven showed lower rates in 1929 than in 1928, the outstanding reduction being for measles (5.4 to 2.5), which caused less than half as many deaths in 1929 as in 1928. Decreases were shown also for typhoid and paratyphoid fever, diphtheria, acute anterior poliomyelitis, dysentery, lethargic encephalitis, and malaria. Other epidemic and endemic diseases showed increased rates, among them being whooping cough, scarlet fever, and erysipelas.

Decreases among other important causes were for pneumonia, all forms (from 98.2 in 1928 to 91.7 in 1929), nephritis (95.3 to 91.2), congenital malformations and diseases of early infancy (65.8 to 62.4), tuberculosis, all forms (79.4 to 76.0), diarrhea and enteritis, under 2 years (20.7 to 17.9), diabetes mellitus (19.0 to 18.8), cancer (96.1 to 96.0), and pellagra (6.1 to 5.8). Deaths from alcoholism decreased from a rate of 4.1 in 1928 to 3.7 in 1929.

Deaths from accidental and unspecified external causes increased from 79.4 to 80.9. The types of accidents which showed the most noticeable increases were automobile accidents, excluding collisions with railroad trains and street cars (20.8 to 23.3) and accidental falls (14.1 to 14.6). A slight decrease was shown for deaths from drowning (7.1 to 6.2).

Deaths and death rates, by principal causes, registration area, 1929 and 1928

Cause of death	Deaths in the registration area in continental United States			
	Number		Rate per 100,000 estimated population	
	1929	1928	1929	1928
All causes [1]	1,386,363	1,378,675	1,192.3	1,207.1
Typhoid and paratyphoid fever	4,854	5,620	4.2	4.9
Malaria	4,084	4,167	3.5	3.6
Smallpox	151	131	.1	.1
Measles	2,923	6,146	2.5	5.4
Scarlet fever	2,468	2,229	2.1	2.0
Whooping cough	7,310	6,234	6.3	5.5
Diphtheria	7,685	8,263	6.6	7.2
Influenza	64,583	51,741	55.5	45.3
Dysentery	2,777	3,215	2.4	2.8
Erysipelas	2,887	2,724	2.5	2.4
Acute anterior poliomyelitis	812	1,381	.7	1.2
Lethargic encephalitis	1,313	1,373	1.1	1.2
Meningococcus meningitis	5,208	2,923	4.5	2.6
Tuberculosis (all forms)	88,352	90,659	76.0	79.4
Of the respiratory system	78,624	80,285	67.6	70.3
Of the meninges, central nervous system	3,114	3,446	2.7	3.0
Other forms	6,614	6,928	5.7	6.1
Syphilis [2]	16,188	16,826	13.9	14.7
Cancer and other malignant tumors	111,569	109,770	96.0	96.1
Of the buccal cavity	3,538	3,555	3.0	3.1
Of the stomach, liver	37,915	38,128	32.6	33.4
Of the peritoneum, intestines, rectum	16,961	16,130	14.6	14.1
Of the female genital organs	15,944	15,839	13.7	13.9
Of the breast	10,204	10,056	8.8	8.8
Of the skin	2,934	3,020	2.5	2.6
Of other or unspecified organs	24,073	23,042	20.7	20.2
Rheumatism	4,401	4,324	3.8	3.8
Pellagra	6,793	6,969	5.8	6.1
Diabetes mellitus	21,829	21,747	18.8	19.0
Pernicious anemia	3,608	3,608	3.1	3.2
Alcoholism (acute or chronic)	4,339	4,627	3.7	4.1
Meningitis (nonepidemic)	3,594	3,287	3.1	2.9
Cerebral hemorrhage and softening	100,061	99,624	86.1	87.2
Paralysis without specified cause	5,532	5,827	4.8	5.1
Diseases of the heart	245,244	237,849	210.9	208.3
Diseases of the arteries, atheroma, aneurysm, etc	25,506	25,112	21.9	22.0
Bronchitis	5,470	5,975	4.7	5.2
Pneumonia (all forms)	106,597	112,195	91.7	98.2
Respiratory diseases other than bronchitis and pneumonia (all forms)	9,635	9,969	8.3	8.7
Ulcer of the stomach and duodenum	7,428	7,329	6.4	6.4
Diarrhea and enteritis	27,357	30,730	23.5	26.9
Diarrhea and enteritis (under 2 years)	20,788	23,663	17.9	20.7
Diarrhea and enteritis (2 years and over)	6,569	7,067	5.6	6.2
Appendicitis and typhlitis	17,687	17,433	15.2	15.3
Hernia, intestinal obstruction	12,283	11,954	10.6	10.5
Cirrhosis of the liver	8,377	8,630	7.2	7.6
Nephritis	106,056	108,813	91.2	95.3
Puerperal septicemia	5,822	5,692	5.0	5.0
Puerperal causes other than puerperal septicemia	9,496	9,999	8.2	8.8
Congenital malformations and diseases of early infancy	72,559	75,159	62.4	65.8
Suicide	16,260	15,566	14.0	13.6
Homicide	9,909	10,050	8.5	8.8
Accidental and unspecified external causes	94,033	90,712	80.9	79.4
Burns (conflagration excepted)	6,168	6,323	5.3	5.5
Accidental drowning	7,252	8,084	6.2	7.1
Accidental shooting	3,015	2,839	2.6	2.5
Accidental falls	16,919	16,116	14.6	14.1
Mine accidents	2,661	2,639	2.3	2.3
Machinery accidents	2,281	2,180	2.0	1.9
Railroad accidents	6,769	6,796	5.8	6.0
Collision with automobile	1,958	2,041	1.7	1.8
Other railroad accidents	4,811	4,755	4.1	4.2
Street-car accidents	1,439	1,581	1.2	1.4
Collision with automobile	507	542	.4	.5
Other street-car accidents	932	1,039	.8	.9
Automobile accidents (excluding collision with railroad trains and street cars)	27,066	23,765	23.3	20.8

[1] Exclusive of stillbirths.
[2] Includes tabes dorsalis (locomotor ataxia) and general paralysis of the insane.

Deaths and death rates, by principal causes, registration area, 1929 and 1928—Contd.

Cause of death	Deaths in the registration area in continental United States: Number 1929	Number 1928	Rate per 100,000 estimated population 1929	Rate 1928
Accidental and unspecified external causes—Continued.				
Injuries by vehicles other than railroad trains, street cars, and automobiles [8]	1,910	1,819	1.6	1.6
Excessive heat (burns excepted)	500	654	.4	.6
Other external causes	18,053	17,916	15.5	15.7
All other defined causes	109,065	108,533	93.8	95.0
Unknown or ill-defined causes	24,258	23,560	20.9	20.6

[8] Includes airplane, balloon, and motor-cycle accidents.

NOTE.—Rates in this summary are based upon revised estimates of population, derived from the 1920 and 1930 censuses, and it will be seen that the rates shown for 1928 vary only slightly from those previously published, which were based on estimates projected from the 1910 and 1920 censuses.

BIRTH RATES AND INFANT MORTALITY RATES, 1929

The Department of Commerce has recently issued the accompanying table showing by States the birth rates for 1929 and the infant mortality rates from 1915 to 1929, inclusive. In 1929 the infant mortality rate (deaths of infants under one year of age per 1,000 live births) showed a marked decrease as compared with 1915. In fact the rate (68) was the second lowest since the establishment of the birth registration area in 1915. At that time this area was composed of 10 States and the District of Columbia and included 31.1 per cent of the population of continental United States, while in 1929 there were 46 States and the District of Columbia in this area, and 94.7 per cent of the total population of continental United States.

For the sixth consecutive year Oregon leads the States with the lowest infant mortality rate (48). In 1929, 11 States had lower rates than at any time since their admission to the registration area. These were Minnesota (51), Arkansas (58), New Jersey (60), Illinois (61), Massachusetts (62), Florida (65), Michigan (66), New Hampshire (68), Louisiana (74), Georgia (76), and South Carolina (91). Two States, Iowa and Maryland, in 1928 attained their lowest rates, which did not change in 1929.

Taking the rate for the registration area of continental United States as a basis, 24 States had lower infant mortality rates in 1929 and 21 had higher rates, while New Hampshire's rate was identical With the exceptions of Colorado, Maine, and Wyoming, the high infant mortality rates in these 21 States were due to the great infant mortality among the colored populations, especially in rural districts.

The birth rate for the year 1929 was 18.9, the lowest for any year since the establishment of the birth registration area. Oregon had the lowest rate (14.1) of any State in the registration area. Signifi-

cant of "the declining birth rate" are the rates of 25 States which are lower than the rate for the birth registration area of continental United States. The highest birth rate, 26.9, is recorded for New Mexico; and Utah, 24.8, North Carolina, 24.7, Alabama, 24.0, West Virginia, 23.8, Mississippi, 22.9, South Carolina, 22.8, follow in the order named. It will be noted that, with two exceptions, the high rates in these States are undoubtedly due to the large percentage of colored population.

Birth rate, 1929, and infant mortality rates, by States, 1915 to 1929

Area	Birth rate, 1929	Infant mortality rate (deaths under 1 year of age per 1,000 live births)														
		1929	1928	1927	1926	1925	1924	1923	1922	1921	1920	1919	1918	1917	1916	1915
Birth registration area in continental United States	18.9	68	69	65	73	72	71	77	76	76	86	87	101	94	101	100
Alabama	24.0	74	75	64	---	---	---	---	---	---	---	---	---	---	---	---
Arizona	22.4	133	142	130	121	---	---	---	---	---	---	---	---	---	---	---
Arkansas	20.2	58	67	61	---	---	---	---	---	---	---	---	---	---	---	---
California	14.8	63	62	62	63	69	67	73	71	66	74	70	---	---	---	---
Colorado	17.4	91	89	---	---	---	---	---	---	---	---	---	---	---	---	---
Connecticut	17.2	61	59	59	72	73	69	77	77	73	92	86	107	94	101	107
Delaware	18.1	81	78	71	93	91	95	104	100	98	---	---	---	---	---	---
District of Columbia	18.4	71	65	68	85	87	76	92	85	83	91	85	112	97	106	111
Florida	18.8	65	67	67	75	74	82	---	---	---	---	---	---	---	---	---
Georgia	20.2	76	82	---	---	---	---	---	---	---	---	---	---	---	---	---
Idaho	19.8	55	59	50	63	---	---	---	---	---	---	---	---	---	---	---
Illinois	17.1	61	64	64	69	73	71	82	76	---	---	---	---	---	---	---
Indiana	18.4	64	63	59	72	68	65	71	67	71	82	79	87	86	---	---
Iowa	17.1	53	53	55	59	56	55	---	---	---	---	---	---	---	---	---
Kansas	17.4	58	59	55	65	62	59	63	65	63	73	70	80	77	---	---
Kentucky	21.7	71	70	61	75	71	65	72	69	62	73	82	93	87	---	---
Louisiana	20.3	74	78	77	---	---	---	---	---	---	---	---	---	---	---	---
Maine	19.9	77	73	80	80	76	81	89	86	88	102	91	101	93	108	105
Maryland	18.5	80	80	81	87	90	86	95	94	94	104	105	140	120	121	---
Massachusetts	17.5	62	64	65	73	73	68	78	81	76	91	88	113	98	100	101
Michigan	20.8	66	69	68	77	75	72	80	75	79	92	90	89	88	96	86
Minnesota	18.3	51	54	52	58	60	57	62	58	59	66	67	71	67	70	70
Mississippi	22.9	72	74	67	70	68	71	68	68	68	---	---	---	---	---	---
Missouri	17.0	62	66	60	---	---	---	---	---	---	---	---	---	---	---	---
Montana	18.7	64	61	66	77	71	67	71	70	---	---	---	---	---	---	---
Nebraska	19.4	52	53	51	59	58	55	57	57	59	64	---	---	---	---	---
Nevada	14.2	67	---	---	---	---	---	---	---	---	---	---	---	---	---	---
New Hampshire	17.6	68	69	69	79	76	80	93	80	87	88	93	113	110	115	110
New Jersey	17.2	60	65	61	70	69	70	72	79	74	---	---	---	---	---	---
New Mexico	26.9	145	---	---	---	---	---	---	---	---	---	---	---	---	---	---
New York	17.4	61	65	59	71	68	69	72	77	75	86	84	97	91	94	99
North Carolina	24.7	79	86	79	82	79	82	81	80	75	85	84	102	100	---	---
North Dakota	21.5	67	59	63	69	72	67	---	---	---	---	---	---	---	---	---
Ohio	17.7	69	66	62	76	70	67	75	72	75	83	90	94	92	---	---
Oklahoma	16.8	70	69	---	---	---	---	---	---	---	---	---	---	---	---	---
Oregon	14.1	48	47	48	52	51	54	57	58	51	62	63	---	---	---	---
Pennsylvania	19.8	71	72	69	82	82	79	90	88	88	97	100	129	111	114	110
Rhode Island	18.0	72	67	67	82	73	80	94	85	93	(1)	(1)	126	108	111	120
South Carolina	22.8	91	97	(1)	(1)	(1)	102	96	93	96	116	113	---	---	---	---
Tennessee	19.5	77	81	71	---	---	---	---	---	---	---	---	---	---	---	---
Utah	24.8	59	59	54	75	56	64	59	69	73	71	71	64	69	---	---
Vermont	18.8	66	65	70	72	72	70	76	73	78	96	85	93	85	93	85
Virginia	22.4	79	76	75	84	81	78	84	77	79	84	91	103	98	---	---
Washington	14.6	49	48	50	56	56	56	57	62	55	66	63	69	69	---	---
West Virginia	23.8	78	70	72	82	80	---	---	---	---	---	---	---	---	---	---
Wisconsin	19.1	60	61	59	69	67	65	70	71	72	77	80	79	78	---	---
Wyoming	19.0	70	68	69	76	64	64	80	79	---	---	---	---	---	---	---

[1] Dropped from the birth registration area.

COURT DECISION RELATING TO PUBLIC HEALTH

Statute requiring "suitable and proper" toilets in places where females were employed upheld.—(Kentucky Court of Appeals; Bailey *v.* Commonwealth, 30 S. W. (2d) 879; decided May 6, 1930.) A State law provided as follows:

Every person, firm or corporation employing females shall provide suitable and proper washrooms and water closets, or privy closets where sewer connection is impossible, and shall keep such closets at all times clean and properly screened and ventilated * * *.

The appellant, who operated a laundry, was convicted in the trial courts of violating this law. In the court of appeals he challenged the constitutionality of the statute, contending that it was void for uncertainty because it failed to erect any standard of conduct possible for a person to know and observe. The question was whether the term "suitable and proper," as applied to toilet facilities, constituted a legal standard.

The court of appeals stated that "A penal or criminal statute must prescribe a rule of conduct with sufficient particularity to enable those affected by it to know what is demanded or forbidden," but it also stated that "a criminal law is not unconstitutional merely because it throws upon people the risk of rightly estimating a matter of degree which deals with fixed and actual, as distinguished from imaginary and unascertained, conditions." The court then pointed out that it had been held for many years that a statute requiring a railroad company to provide "a convenient and suitable waiting room and water closet * * * at all * * * cities and towns * * * and keep and maintain the same in decent order and repair" was valid, and that the standard set up by that statute had been defined by the court of appeals and was well understood when the act involved in the instant case was adopted. Proceeding, the court said:

It is not pointed out that any material difference exists between the standard of "suitable and convenient" imposed upon the railroads with respect to toilets, and that of "suitable and proper" addressed to another class, of which the appellant is a member, and referring to the same subject. One is as certain, exact, and comprehensive as the other, and as easily obeyed. And the later legislation has the added benefit of the light reflected by experience in the administration of the earlier enactment. We apprehend no practical difficulty could be encountered by any one in observing the directions of the statute. Washrooms and water closets are matters of such common convenience and everyday experience that it would be "easy for common sense to keep to what is safe," and avoid any danger from mistaking the meaning of the law. The settled construction of the words used in the railroad statutes furnishes a safe guide for anyone wishing to comply with the act here involved. The enactment is sufficiently specific to meet the constitutional requirements, since it plainly provides what is necessary to be done by those coming within its purview, and is not subject to the criticism that it is too vague and uncertain for practical observance. * * *

DEATHS DURING WEEK ENDED OCTOBER 18, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended October 18, 1930, and corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

	Week ended Oct. 18, 1930	Corresponding week, 1929
Policies in force	75, 391, 169	74, 934, 881
Number of death claims	12, 205	13, 292
Death claims per 1,000 policies in force, annual rate	8. 4	9. 2

Deaths [1] from all causes in certain large cities of the United States during the week ended October 18, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Oct. 18, 1930				Corresponding week 1929		Death rate[2] for first 42 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (78 cities)	7, 211	10. 9	717	[4] 58	11. 7	679	12. 0	12. 8
Akron	37	7. 6	5	46	8. 1	3	8. 0	9. 4
Albany [5]	23	9. 4	3	62	14. 4	5	14. 8	16. 5
Atlanta	65	12. 7	10	102	17. 7	4	15. 9	16. 2
White	28		4	63		1		
Colored	37	(6)	6	172	(6)	3	(6)	(6)
Baltimore [5]	189	12. 3	15	52	14. 4	22	14. 0	14. 8
White	146		12	53		14		
Colored	43	(6)	3	48	(6)	8	(6)	(6)
Birmingham	65	13. 1	14	135	15. 9	8	13. 8	16. 2
White	23		0	0		3		
Colored	42	(6)	14	343	(6)	5	(6)	(6)
Boston	211	14. 0	18	52	11. 4	24	14. 1	15. 1
Bridgeport	31	11. 0	4	68	10. 3	2	11. 0	12. 3
Buffalo	129	11. 7	12	54	14. 7	16	13. 0	14. 1
Cambridge	32	14. 7	3	60	17. 0	7	11. 9	12. 6
Camden	27	12. 0	6	105	14. 7	5	13. 6	14. 5
Canton	22	10. 8	3	80	12. 0	1	10. 0	11. 4
Chicago [5]	579	8. 9	53	47	10. 7	44	10. 4	11. 3
Cincinnati	105	12. 2	12	71	17. 3	14	15. 6	17. 2
Cleveland	188	10. 8	17	51	11. 5	18	11. 1	12. 6
Columbus	66	11. 9	8	79	10. 9	5	15. 7	14. 9
Dallas	42	8. 3	7		11. 3	8	11. 3	11. 6
White	30		4			8		
Colored	12	(6)	3		(6)	0	(6)	(6)
Dayton	53	13. 7	7	105	13. 0	7	10. 8	11. 7
Denver	65	11. 8	5	55	15. 5	8	14. 8	14. 9
Des Moines	37	13. 5	6	111	9. 6	3	11. 8	11. 7
Detroit	238	7. 8	37	57	9. 8	31	9. 4	11. 3
Duluth	21	10. 8	0	0	7. 2	0	11. 3	11. 6
El Paso	36	18. 3	4		18. 7	8	17. 5	19. 9
Erie	14	6. 3	1	22	11. 8	2	11. 2	12. 5
Fall River [5 7]	24	10. 9	4	92	13. 2	2	12. 0	13. 9
Flint	27	8. 9	6	71	8. 6	6	9. 2	10. 9
Fort Worth	27	8. 7	0		9. 2	1	11. 1	12. 4
White	26		0			1		
Colored	1	(6)	0		(6)	0	(6)	(6)
Grand Rapids	28	8. 6	4	60	10. 7	4	10. 3	10. 2
Houston	47	8. 4	6		13. 0	13	12. 2	12. 8
White	34		2			11		
Colored	13	(6)	4		(6)	2	(6)	(6)
Indianapolis	83	11. 9	4	30	14. 2	6	14. 7	14. 8
White	71		3	26		6		
Colored	12	(6)	1	58	(6)	0	(6)	(6)
Jersey City	73	12. 0	11	95	9. 8	4	11. 3	12. 5
Kansas City, Kans	31	13. 2	3	70	12. 0	3	11. 8	13. 2
White	24		2	55		1		
Colored	7	(6)	1	152	(6)	2	(6)	(6)
Kansas City, Mo	97	12. 8	14	117	14. 4	8	13. 5	14. 1
Knoxville	38	18. 6	4	94	10. 1	0	13. 7	14. 0
White	31		3	78		0		
Colored	7	(6)	1	243	(6)	0	(6)	(6)

See footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended October 18, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929*—Continued

City	Week ended Oct. 18, 1930				Corresponding week 1929		Death rate[2] for first 42 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1930	1929
Los Angeles	254	10.6	15	45	11.2	19	11.1	11.4
Louisville	86	14.6	5	43	13.6	9	13.6	15.0
White	57		4	39		6		
Colored	29	(6)	1	66	(6)	3	(6)	(6)
Lowell[7]	30	15.6	5	132	13.4	3	13.5	14.2
Lynn	16	8.1	1	28	8.2	2	10.4	11.4
Memphis	83	17.1	11	129	15.0	4	17.1	19.2
White	33		6	108		2		
Colored	50	(6)	5	168	(6)	2	(6)	(6)
Milwaukee	103	9.4	12	53	8.8	15	9.8	11.1
Minneapolis	89	10.0	3	20	9.4	4	10.7	10.8
Nashville	61	21.6	15	235	18.8	9	17.5	18.9
White	39		10	210		7		
Colored	22	(6)	5	311	(6)	2	(6)	(6)
New Bedford[7]	28	12.9	5	128	4.6	0	10.9	12.2
New Haven	27	8.7	2	31	14.1	0	12.7	13.4
New Orleans	157	17.9	18	100	16.0	16	17.5	17.7
White	93		8	68		4		
Colored	64	(6)	10	162	(6)	12	(6)	(6)
New York	1,275	9.5	110	46	10.4	106	10.8	11.4
Bronx Borough	157	6.4	13	38	7.7	15	7.9	8.3
Brooklyn Borough	422	8.4	53	56	10.0	53	9.7	10.3
Manhattan Borough	523	14.7	38	49	14.0	33	16.1	16.5
Queens Borough	139	6.6	5	20	7.2	4	7.1	7.7
Richmond Borough	34	11.2	1	19	15.9	1	14.4	16.0
Newark, N. J	90	10.5	9	47	10.9	11	12.0	12.8
Oakland	49	8.9	7	87	8.6	2	10.9	11.4
Oklahoma City	40	11.3	7	126	11.2	3	10.9	10.8
Omaha	50	12.1	2	24	12.8	8	13.5	13.7
Paterson	18	6.8	1	17	10.6	2	12.2	13.3
Philadelphia	427	11.3	47	70	13.1	33	12.5	13.2
Pittsburgh	176	13.7	31	110	11.8	20	13.8	14.8
Portland, Oreg	71	12.3	8	99	10.7	1	12.2	12.7
Providence	57	11.8	7	65	13.6	12	13.1	14.6
Richmond	56	15.9	7	102	19.2	8	14.8	16.4
White	32		3	66		3		
Colored	24	(6)	4	171	(6)	5	(6)	(6)
Rochester	70	11.2	9	80	12.1	5	11.7	12.4
St. Louis	193	12.2	12	42	12.2	10	14.2	14.7
St. Paul	54	10.4	2	20	13.0	2	10.1	10.5
Salt Lake City[5]	35	13.0	3	48	10.5	3	12.2	13.0
San Antonio	41	8.3	6		10.9	7	14.9	14.5
San Diego	39	13.6	1	21	15.7	1	14.4	15.2
San Francisco	138	11.4	2	14	8.9	6	13.1	13.1
Schenectady	21	11.4	1	31	7.7	2	11.3	12.3
Seattle	70	10.0	0	0	12.9	5	10.9	11.2
Somerville	16	8.0	2	63	6.1	1	9.8	9.3
Spokane	26	11.7	4	104	11.8	1	12.3	12.8
Springfield, Mass	34	11.8	1	17	11.2	4	12.2	12.9
Syracuse	49	12.3	4	49	13.0	5	11.7	13.2
Tacoma	27	13.2	0	0	13.2	1	12.3	11.9
Toledo	82	14.7	4	37	12.1	7	12.7	13.6
Trenton	40	17.0	5	96	11.9	5	16.8	17.1
Utica	28	14.2	0	0	24.5	5	14.6	15.8
Washington, D. C	128	13.7	15	88	14.2	8	15.1	15.4
White	79		4	35		4		
Colored	49	(6)	11	196	(6)	4	(6)	(6)
Waterbury	11	5.7	1	24	10.9	3	9.5	9.6
Wilmington, Del.[7]	25	12.4	2	48	15.3	2	14.6	14.0
Worcester	43	11.4	7	97	13.4	5	12.7	12.7
Yonkers	21	8.1	0	0	8.3	3	8.0	9.3
Youngstown	27	8.3	2	29	12.6	9	10.3	12.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; NewOrleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended October 25, 1930, and October 26, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 25, 1930, and October 26, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929
New England States:								
Maine	1	2	--------	1	3	27	1	0
New Hampshire	1	3	--------	7	--------	24	0	1
Vermont	1	1	--------	--------	--------	--------	0	0
Massachusetts	81	131	1	1	113	125	2	3
Rhode Island	8	13	--------	3	--------	--------	0	0
Connecticut	7	24	1	3	13	2	0	1
Middle Atlantic States:								
New York	63	121	[1] 4	[1] 17	75	120	12	15
New Jersey	65	116	7	2	25	15	0	5
Pennsylvania	120	176	--------	--------	133	238	0	5
East North Central States:								
Ohio	57	98	10	16	13	136	1	3
Indiana	45	27	--------	--------	15	18	1	0
Illinois	143	234	16	11	25	112	6	3
Michigan	80	121	6	1	50	127	8	21
Wisconsin	16	22	18	6	77	182	0	3
West North Central States:								
Minnesota	11	41	--------	--------	7	21	1	0
Iowa	11	15	--------	--------	--------	71	1	0
Missouri	40	64	1	6	69	13	8	4
North Dakota	--------	11	--------	--------	--------	18	0	3
South Dakota	7	6	--------	--------	2	--------	0	2
Nebraska	7	23	--------	--------	1	22	1	0
Kansas	15	31	2	--------	7	17	0	0
South Atlantic States:								
Delaware	1	2	--------	--------	--------	--------	0	0
Maryland [2]	41	21	8	17	2	4	0	1
District of Columbia	7	9	1	2	2	1	0	0
Virginia	--------	--------	--------	--------	--------	--------	--------	--------
West Virginia	43	39	8	14	24	11	0	1
North Carolina	192	278	6	4	3	2	1	2
South Carolina	53	68	391	--------	--------	--------	0	0
Georgia	24	44	59	45	3	3	0	2
Florida	17	19	--------	4	2	1	0	0
East South Central States:								
Kentucky	24	30	--------	--------	--------	--------	2	0
Tennessee	64	46	17	61	12	20	2	1
Alabama	89	88	25	36	15	11	3	3
Mississippi	61	103	--------	--------	--------	--------	1	1

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 25, 1930, and October 26, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929
West South Central States:								
Arkansas	9	24	6	19		1	0	0
Louisiana	16	50	6	6		1	2	0
Oklahoma [3]	77	78	15	29	8	23	0	0
Texas	30	98	33	21	4	4	0	0
Mountain States:								
Montana	1	1			1	68	0	2
Idaho	1				1	2	0	4
Wyoming				1			0	2
Colorado	17	5			51	3	0	1
New Mexico	5	10			8		1	0
Arizona	13	18	4	3	28	1	1	0
Utah [2]		2		4	3	1	2	2
Pacific States:								
Washington	27	33		12	3	12	2	6
Oregon	4	7	5	10	54	14	1	0
California	69	75	23	32	86	40	8	6

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929
New England States:								
Maine	11	0	17	24	0	0	14	3
New Hampshire	5	0	8	16	0	0	3	0
Vermont	0	0	10	3	0	0	0	0
Massachusetts	22	7	105	175	0	0	8	7
Rhode Island	1	1	11	16	0	0	5	1
Connecticut	3	1	16	33	0	0	7	3
Middle Atlantic States:								
New York	19	14	179	169	1	25	43	29
New Jersey	1	1	71	69	0	0	12	8
Pennsylvania	4	9	319	255	4	2	61	59
East North Central States:								
Ohio	49	11	230	202	14	56	41	29
Indiana	8	0	92	61	28	31	15	3
Illinois	28	3	207	285	28	74	39	24
Michigan	20	8	139	153	17	38	24	7
Wisconsin	8	0	59	62	6	6	2	2
West North Central States:								
Minnesota	13	2	36	74	6	5	4	4
Iowa	14	7	45	69	13	23	1	2
Missouri	13	0	38	86	20	6	22	9
North Dakota	1	1	13	17	7	12	2	3
South Dakota	8	0	4	11	7	21	1	1
Nebraska	14	0	26	8	2	3	0	2
Kansas	43	0	38	60	7	13	10	2
South Atlantic States:								
Delaware	0	1	3	3	0	0	9	0
Maryland [2]	4	1	48	61	0	0	47	18
District of Columbia	1	1	18	7	0	0	2	1
Virginia		9				6		
West Virginia	1	5	77	46	1	1	46	24
North Carolina	0	4	133	138	0	2	13	17
South Carolina	1	5	27	37	2	0	32	28
Georgia	1	4	49	64	0	0	22	15
Florida	0	0	5	13	2	0	3	3
East South Central States:								
Kentucky	0	1	43	72	0	7	19	10
Tennessee	2	2	50	52	7	1	37	18
Alabama	1	2	67	79	0	0	26	32
Mississippi	1	0	36	38	0	0	14	14
West South Central States:								
Arkansas	1	0	7	36	3	0	21	11
Louisiana	4	0	13	21	0	0	15	11
Oklahoma [3]	1	0	38	50	11	13	39	26
Texas	4	1	21	31	4	2	19	7

[2] Week ended Friday. [3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 25, 1930, and October 26, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929	Week ended Oct. 25, 1930	Week ended Oct. 26, 1929
Mountain States:								
Montana	1	1	8	26	0	8	2	18
Idaho	3	0	1	14	0	4	2	0
Wyoming	1	0	7	7	0	1	2	0
Colorado	5	0	17	13	0	5	5	10
New Mexico	0	0	3	10	0	1	12	12
Arizona	2	0	9	6	5	0	3	1
Utah [2]	0	0	7	6	0	0	3	2
Pacific States:								
Washington	4	0	65	42	29	35	14	8
Oregon	2	2	14	16	14	10	4	3
California	72	0	66	145	11	31	14	10

[2] Week ended Friday.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September, 1930										
Alabama	6	107	21	687	30	35	5	116	5	117
California	12	130	66	4	192	5	250	176	42	70
Delaware		5	1		3		2	16	0	25
Georgia	2	81	60	440	47	56	5	73	18	163
Idaho	1	16			12		3	22	6	7
Illinois	16	387	35	50	56		131	400	64	[1] 193
Louisiana	1	108	15	132	12	39	39	57	4	131
Minnesota	3	56	7		6		98	119	11	22
Missouri	15	105	5	31	40		68	107	19	132
North Carolina	9	456	50		18	350	21	321	2	163
Oklahoma [2]	4	94	17	318	10	42	32	64	25	171
Pennsylvania	30	379		2	245	1	48	474	0	396
Rhode Island	1	19			4		9	27		11
South Dakota	1	42	27		12		26	24	36	11
Washington	6	35	7		34		10	118	59	21
West Virginia		81	18		45		8	108	15	240

[1] Diagnosis in a case reported in August in Fayette County as typhoid fever has been changed to tularæmia, making the totals reported for that month 166 cases of typhoid fever and 2 cases of tularæmia. (See Public Health Reports for Oct. 3, 1930, pp. 2396 and 2397.)
[2] Exclusive of Oklahoma City and Tulsa.

September, 1930

	Cases
Anthrax:	
Delaware	1
Louisiana	1
Pennsylvania	3
Botulism:	
California	5
Chicken pox:	
Alabama	18
California	264
Delaware	2
Georgia	21
Idaho	1
Illinois	144
Chicken pox—Continued.	
Louisiana	4
Minnesota	70
Missouri	26
North Carolina	39
Pennsylvania	245
Rhode Island	5
South Dakota	13
Washington	84
West Virginia	10
Conjunctivitis:	
Georgia	1
Oklahoma [2]	1

[2] Exclusive of Oklahoma City and Tulsa.

	Cases
Dengue:	
Alabama	1
Georgia	1
Dysentery:	
California (amebic)	2
California (bacillary)	9
Georgia	25
Illinois	66
Illinois (amebic)	8
Illinois (bacillary)	10
Louisiana	4
Minnesota (unspecified)	23
Minnesota (amebic)	2
Oklahoma [2]	32
Pennsylvania	19
Washington	4
Food poisoning:	
California	24
German measles:	
California	22
Georgia	228
Illinois	14
North Carolina	8
Pennsylvania	37
Rhode Island	3
Washington	22
Granuloma, coccidioidal:	
California	2
Hookworm disease:	
Georgia	228
Louisiana	24
Impetigo contagiosa:	
Washington	5
Lead poisoning:	
Illinois	4
Leprosy:	
Illinois	1
Lethargic encephalitis:	
Alabama	6
California	8
Illinois	4
Louisiana	4
Minnesota	1
Pennsylvania	8
Washington	5
Mumps:	
Alabama	15
California	367
Delaware	3
Georgia	11
Iowa	7
Illinois	164
Louisiana	1
Missouri	27
Oklahoma [2]	2
Pennsylvania	174
Rhode Island	
South Dakota	1
Washington	67
Ophthalmia neonatorum:	
Delaware	1
Illinois	20
Missouri	3
Pennsylvania	16

	Cases
Paratyphoid fever:	
California	3
Georgia	5
Illinois	3
Louisiana	3
North Carolina	3
Washington	5
Puerperal septicemia:	
Illinois	10
Pennsylvania	15
Rabies in animals:	
California	60
Illinois	2
Louisiana	10
Missouri	7
Rhode Island	2
Rabies in man:	
Alabama	2
Scabies:	
Delaware	1
Oklahoma [2]	1
Washington	13
Septic sore throat:	
Georgia	13
Illinois	3
Louisiana	1
Minnesota	2
Missouri	12
North Carolina	18
Oklahoma [2]	22
Tetanus:	
California	2
Georgia	1
Illinois	7
Louisiana	6
Oklahoma [2]	3
Pennsylvania	8
South Dakota	1
Trachoma:	
California	19
Georgia	5
Illinois	27
Minnesota	1
Missouri	152
Oklahoma [2]	4
Pennsylvania	10
South Dakota	1
Trichinosis:	
California	2
Pennsylvania	1
Tularaemia:	
California	2
Illinois [1]	1
Louisiana	1
Minnesota	1
Missouri	2
Washington	1
Typhus fever:	
Alabama	19
Georgia	18
North Carolina	3
Undulant fever:	
Alabama	2
California	13

[1] Diagnosis in a case reported in August in Fayette County as typhoid fever has been changed to tularaemia, making the totals reported for that month 166 cases of typhoid fever and 2 cases of tularaemia. (See Public Health Reports for Oct. 3, 1930, pp. 2396 and 2397.)

[2] Exclusive of Oklahoma City and Tulsa.

Undulant fever—Continued.	Cases
Georgia	1
Illinois	2
Louisiana	2
Minnesota	8
Missouri	10
Pennsylvania	1
Washington	5
Vincent's angina:	
Illinois	3
Oklahoma [1]	1
Whooping cough:	
Alabama	75
California	408
Delaware	1

Whooping cough—Continued.	Cases
Georgia	41
Iowa	52
Illinois	521
Louisiana	20
Minnesota	83
Missouri	74
North Carolina	325
Oklahoma [1]	14
Pennsylvania	776
Rhode Island	48
South Dakota	19
Washington	162
West Virginia	65

[1] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,165,000. The estimated population of the 91 cities reporting deaths is more than 30,570,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended October 18, 1930, and October 19, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,563	2,376	
98 cities	441	823	942
Measles:			
45 States	876	1,364	
98 cities	220	182	
Meningococcus meningitis:			
46 States	86	106	
98 cities	36	58	
Poliomyelitis:			
46 States	569	131	
Scarlet fever:			
46 States	2,317	2,691	
98 cities	759	841	723
Smallpox:			
46 States	188	353	
98 cities	10	71	9
Typhoid fever:			
46 States	770	632	
98 cities	104	106	108
Deaths reported			
Influenza and pneumonia:			
91 cities	464	603	
Smallpox:			
91 cities	0	1	
Tacoma, Wash	0	1	

City reports for week ended October 18, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and City	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	2	1	1		0	0	0	1
New Hampshire:								
Concord	0	0	0		0	0	0	0
Manchester	0	1	0		0	3	0	0
Nashua	0	0	1		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	1	1	0		0	0	0	0
Massachusetts:								
Boston	16	26	13	1	0	15	1	20
Fall River	2	4	4		0	0	0	1
Springfield	15	4	1		1	0	4	2
Worcester	3	4	2		0	0	2	0
Rhode Island:								
Pawtucket	0	1	0		0	0	0	2
Providence	4	7	5		1	0	0	2
Connecticut:								
Bridgeport	0	5	0		1	2	0	3
Hartford	0	4	2		0	3	3	3
New Haven	1	0	1		0	0	1	2
MIDDLE ATLANTIC								
New York:								
Buffalo	11	13	8		0	4	2	10
New York	28	120	42	6	5	31	18	86
Rochester	6	4	2		0	1	0	4
Syracuse	10	3	0		0	0	3	0
New Jersey:								
Camden	5	7	1	1	1	2	0	1
Newark	3	13	8	5	0	1	4	4
Trenton	1	2	0		0	0	0	2
Pennsylvania:								
Philadelphia	17	51	5	9	3	7	7	24
Pittsburgh	5	21	7		0	2	2	22
Reading	2	1	0		0	0	7	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	3	11	1		0	1	1	11
Cleveland	36	48	6	4	1	0	7	9
Columbus	3	5	5		0	1	3	4
Toledo	12	9	6		0	2	3	5
Indiana:								
Fort Wayne	3	4	0		0	0	0	0
Indianapolis	3	15	5		0	3	1	5
South Bend	10	2	1		0	0	0	1
Terre Haute	0	2	1		1	0	0	3
Illinois:								
Chicago	91	102	69	1	3	6	29	27
Springfield	2	1	0	1	0	0	0	0
Michigan:								
Detroit	33	64	51	6	1	3	3	13
Flint	11	5	2		0	3	1	1
Grand Rapids	4	3	0		0	0	1	2

City reports for week ended October 18, 1930

Division, State, and City	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—contd.								
Wisconsin:								
Kenosha	12	1	0		0	1	1	0
Madison	5	0	0			0	5	
Milwaukee	23	16	6		0	4	9	5
Racine	10	1	0		0	0	0	0
Superior	2	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	20	2	2		0	0	0	1
Minneapolis	29	32	2		0	2	12	3
St. Paul	16	13	6		0	0	1	3
Iowa:								
Davenport	1	1	1			0	0	
Des Moines	0	5	0			0	0	
Sioux City	0	2	7			0	1	
Waterloo	12	0	0			0	0	
Missouri:								
Kansas City	10	10	6		0	2	0	7
St. Joseph	0	2	0		0	0	0	1
St. Louis	5	40	8		1	68	2	
North Dakota:								
Fargo	8	0	0		0	0	2	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	0	0	0			0	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Lincoln	6	3	1		0	0	2	0
Omaha	5	14	6		0	2	1	3
Kansas:								
Topeka	1	2	2	1	1	0	2	0
Wichita	1	4	0		0	0	0	0
SOUTH ATLANTIC								
Delaware:								
Wilmington	2	2	0		0	0	0	3
Maryland:								
Baltimore	20	22	8	5	0	0	1	12
Cumberland	0	0	0		0	0	0	1
Frederick	0	1	1		0	0	0	0
District of Columbia:								
Washington	1	17	6		0	1	0	7
Virginia:								
Lynchburg	0	4	1		0	2	0	0
Norfolk	1	3	5		0	1	0	4
Richmond	1	22	6		1	1	0	3
Roanoke	0	7	3		1	0	1	1
West Virginia:								
Charleston	0	2	2		0	0	5	5
Wheeling	6	1	0		0	0	0	1
North Carolina:								
Raleigh	1	4	3		0	0	0	0
Wilmington	0	2	7		0	0	0	2
Winston-Salem	1	6	1		0	0	1	4
South Carolina:								
Charleston	0	1	2	2	1	0	0	0
Columbia	1	1	1		0	0	1	3
Greenville	0	2	1		0	0	0	0
Georgia:								
Atlanta	0	10	5	12	0	0	0	4
Brunswick	0	0	0		0	0	0	0
Savannah	0	2	2	2	0	0	0	2
Florida:								
Miami	0	2	1		0	0	0	2
St. Petersburg		0			0			0
Tampa	0	3	2		0	0	0	0

City reports for week ended October 18, 1930—Continued

Division, State, and City	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	2	2	----------	0	0	0	1
Tennessee:								
Memphis	1	9	10	----------	0	0	1	11
Nashville	2	2	2	----------	0	0	0	7
Alabama:								
Birmingham	0	6	4	----------	0	1	0	5
Mobile	0	2	2	----------	0	0	0	1
Montgomery	0	3	4	2	----------	0	0	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	2	0	----------	----------	0	0	----------
Little Rock	1	2	2	----------	0	0	0	1
Louisiana:								
New Orleans	0	11	10	2	2	1	0	16
Shreveport	0	2	1	----------	0	0	0	0
Oklahoma:								
Muskogee	0	5	4	1	0	0	0	0
Tulsa	0	5	4	----------	----------	0	1	----------
Texas:								
Dallas	1	17	9	----------	0	0	1	2
Fort Worth	2	5	0	----------	0	0	0	0
Galveston	0	0	0	----------	0	0	0	1
Houston	0	7	8	----------	0	0	0	2
San Antonio	0	3	4	----------	0	0	0	3
MOUNTAIN								
Montana:								
Billings	0	0	0	----------	0	0	0	0
Great Falls	2	1	0	----------	0	0	0	1
Helena	0	0	0	----------	0	0	0	0
Missoula	10	0	0	----------	0	0	0	0
Idaho:								
Boise	0	0	0	----------	0	0	0	1
Colorado:								
Denver	18	10	1	----------	0	4	5	14
Pueblo	0	1	0	----------	0	18	0	3
New Mexico:								
Albuquerque	0	0	0	----------	1	0	0	0
Arizona:								
Phoenix	0	0	1	----------	0	0	0	0
Utah:								
Salt Lake City	6	3	1	----------	1	0	1	3
Nevada:								
Reno	0	0	0	----------	0	0	0	0
PACIFIC								
Washington:								
Seattle	0	4	17	----------	----------	0	20	----------
Spokane	15	3	0	----------	----------	0	0	----------
Tacoma	1	4	8	----------	0	0	0	1
Oregon:								
Portland	7	10	0	1	0	0	3	3
Salem	0	0	0	----------	0	0	0	0
California:								
Los Angeles	7	33	14	11	2	21	19	14
Sacramento	3	2	2	----------	0	0	11	3
San Francisco	18	14	2	2	1	7	3	8

City reports for week ended October 18, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	2	6	0	0	0	1	0	0	0	7	18
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	7
Manchester	1	5	0	0	0	0	0	0	0	0	14
Nashua	0	0	0	0	0	0	0	0	0	0	-------
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	0
Burlington	0	1	0	0	0	0	0	0	0	0	20
Massachusetts:											
Boston	38	22	0	0	0	12	3	0	0	16	211
Fall River	2	0	0	0	0	2	0	0	0	0	24
Springfield	4	0	0	0	0	0	0	0	0	0	27
Worcester	7	26	0	0	0	3	0	0	0	1	43
Rhode Island:											
Pawtucket	0	1	0	0	0	0	0	0	0	0	19
Providence	4	3	0	0	0	3	0	1	0	3	57
Connecticut:											
Bridgeport	4	6	0	0	0	2	0	2	0	0	31
Hartford	3	1	0	0	0	2	0	0	0	2	34
New Haven	3	2	0	0	0	1	1	1	0	8	27
MIDDLE ATLANTIC											
New York:											
Buffalo	15	13	0	0	0	4	1	0	0	9	129
New York	61	40	0	0	0	88	23	16	4	104	1,285
Rochester	4	8	0	0	0	0	0	0	0	3	69
Syracuse	4	8	0	0	0	0	0	0	0	12	49
New Jersey:											
Camden	2	2	0	0	0	1	0	0	0	2	27
Newark	7	6	0	0	0	7	2	1	0	19	92
Trenton	2	3	0	0	0	3	1	0	0	1	40
Pennsylvania:											
Philadelphia	44	62	0	0	0	13	8	5	0	15	427
Pittsburgh	29	46	0	0	0	6	1	0	0	7	176
Reading	1	0	0	0	0	1	0	0	0	3	21
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	10	21	0	0	0	2	1	0	1	1	105
Cleveland	21	22	0	0	0	12	2	0	0	17	188
Columbus	8	3	0	0	0	3	1	3	0	1	65
Toledo	9	4	0	1	0	5	1	1	0	0	82
Indiana:											
Fort Wayne	1	0	1	0	0	0	0	0	0	0	28
Indianapolis	9	18	0	0	0	1	1	0	0	0	-------
South Bend	0	5	1	0	3	0	0	0	0	0	17
Terre Haute	2	3	-------	0	0	0	0	0	0	0	21
Illinois:											
Chicago	66	103	0	5	0	39	5	4	0	56	579
Springfield	3	4	0	0	0	0	0	0	0	7	14
Michigan:											
Detroit	54	53	0	1	0	18	4	0	0	55	238
Flint	9	17	0	0	0	1	1	1	0	6	27
Grand Rapids	7	10	0	0	0	1	0	2	0	2	28
Wisconsin:											
Kenosha	1	0	0	0	0	0	0	0	0	3	4
Madison	1	6	0	0	-------	-------	0	1	-------	3	-------
Milwaukee	17	16	0	0	0	11	0	1	0	30	103
Racine	3	11	0	0	0	0	0	0	0	2	18
Superior	2	0	0	0	0	0	0	0	0	3	7
WEST NORTH CENTRAL											
Minnesota:											
Duluth	6	0	0	0	0	4	0	1	0	6	21
Minneapolis	36	9	1	0	0	2	2	1	1	2	89
St. Paul	17	10	0	0	0	3	1	0	0	6	56

City reports for week ended October 18, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL—con.											
Iowa:											
Davenport	1	1	1	1			0	0		0	
Des Moines	8	5	0	1			0	0		0	37
Sioux City	2	2	0	0			0	0		0	1
Waterloo	2	1	0	0			0	0		2	
Missouri:											
Kansas City	12	3	0	0	0	6	2	0	0	4	97
St. Joseph	1	4	0	0	0	0	0	0	0	0	18
St. Louis	28	19	0	0	0	14	4	5	0	8	103
North Dakota:											
Fargo	2	3	0	0	0	1	0	0	0	0	6
Grand Forks	0	0	0	0			0	0		0	
South Dakota:											
Aberdeen	2	0	0	0			1	0		0	
Sioux Falls	1	0	0	2			0	0		0	7
Nebraska:											
Lincoln	2	2	0	1	0	0	0	0	0	2	12
Omaha	4	6	0	0	0	2	0	0	0	1	50
Kansas:											
Topeka	4	1	0	0	0	0	0	0	1	0	15
Wichita	4	2	0	0	0	1	0	1	0	0	25
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	0	0	0	0	0	0	0	0	2	25
Maryland:											
Baltimore	12	15	0	0	0	9	6	6	5	35	189
Cumberland	0	4	0	0	0	1	1	2	1	0	18
Frederick	0	0	0	0	0	0	0	0	0	0	4
District of Columbia:											
Washington	13	8	0	0	0	7	2	0	0	7	128
Virginia:											
Lynchburg	3	1	0	0	0	0	0	4	1	0	13
Norfolk	1	5	0	0	0	1	1	2	0	0	
Richmond	9	13	0	0	0	4	1	2	0	0	49
Roanoke	4	2	0	0	0	0	1	0	0	0	18
West Virginia:											
Charleston	4	0	0	0	0	0	1	1	1	0	31
Wheeling	2	0	0	0	0	1	1	0	0	0	15
North Carolina:											
Raleigh	2	0	0	0	0	0	0	0	0	0	13
Wilmington	1	3	0	0	0	0	0	0	0	0	12
Winston-Salem	4	1	0	0	0	1	0	0	0	0	22
South Carolina:											
Charleston	1	1	0	0	0	0	2	2	0	0	23
Columbia	1	3	0	0	0	3	0	1	1	0	30
Greenville	0	0	0	0	0	0	1	0	0	1	
Georgia:											
Atlanta	8	8	0	0	0	3	1	[1] 11	0	0	66
Brunswick	0	0	0	0	0	0	0	0	0	0	1
Savannah	1	3	0	0	0	3	0	2	0	0	
Florida:											
Miami	0	0	0	0	0	2	0	0	0	0	24
St. Petersburg	0		0		0	0	0		0		6
Tampa	0	1	0	0	0	0	0	0	0	0	19
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	8	0	0	0	1	0	0	0	0	15
Tennessee:											
Memphis	5	5	0	0	0	3	3	7	0	0	83
Nashville	2	1	0	0	0	2	3	0	0	0	61
Alabama:											
Birmingham	5	6	0	0	0	7	2	0	1	0	65
Mobile	0	1	0	0	0	0	0	0	1	0	11
Montgomery	0	1	0	0			0	0		1	

[1] Includes nonresidents.

City reports for week ended October 18, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	1	0	0			0	0		0	
Little Rock	3	2	0	0	0	1	0	0	0	0	
Louisiana:											
New Orleans	4	11	0	0	0	11	3	2	1	7	157
Shreveport	1	0	0	0	0	1	1	0	0	0	34
Oklahoma:											
Muskogee	1	1	0	0	0	0	0	4	0	0	
Tulsa	3	2	0	0			1	0		0	
Texas:											
Dallas	5	5	0	0	0	2	2	0	0	0	42
Fort Worth	2	1	0	0	0	3	0	1	1	0	27
Galveston	0	0	0	0	0	0	0	0	0	0	11
Houston	2	2	0	1	0	2	0	0	0	0	47
San Antonio	0	0	0	0	0	5	0	4	0	0	41
MOUNTAIN											
Montana:											
Billings	0	0	0	2	0	0	0	1	0	4	4
Great Falls	1	6	0	0	0	0	0	0	0	0	4
Helena	1	0	0	0	0	0	0	0	0	0	6
Missoula	0	0	0	0	0	0	1	1	0	0	6
Idaho:											
Boise	1	0	0	0	0	1	0	0	0	0	10
Colorado:											
Denver	8	13	0	0	0	8	1	0	0	16	68
Pueblo	1	0	0	0	0	0	1	0	0	1	18
New Mexico:											
Albuquerque	1	0	0	0	0	2	1	1	0	0	9
Arizona:											
Phoenix	1	1	0	0	0	2	0	0	0	0	14
Utah:											
Salt Lake City	3	8	1	1	0	2	3	2	1	11	35
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	7	5	0	0			2	4		7	
Spokane	7	1	1	0			1	1		0	
Tacoma	2	0	2	0	0	0	1	0	0	0	27
Oregon:											
Portland	7	1	3	0	0	6	1	0	0	0	71
Salem	0	0	0	0	0	0	1	0	0	4	
California:											
Los Angeles	17	8	1	0	0	23	2	5	0	26	254
Sacramento	2	3	0	0	0	2	1	0	0	6	25
San Francisco	10	8	1	0	0	7	1	1	0	6	162

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	1	5	0
Massachusetts:									
Boston	1	0	0	0	0	0	2	21	3
Fall River	0	1	0	0	0	0	0	0	0
Worcester	0	1	0	0	0	0	1	1	0
Connecticut:									
Hartford	0	0	0	0	0	0	0	1	0

City reports for week ended October 18, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
MIDDLE ATLANTIC									
New York:									
New York [1]	9	6	2	0	0	0	14	4	0
Rochester	0	0	0	0	0	0	0	6	1
Syracuse	0	0	0	0	0	0	0	3	0
Pennsylvania:									
Philadelphia	2	2	0	0	1	0	1	1	0
Pittsburgh	1	0	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	1	0	0	0	0	1	4	1
Cleveland	2	0	0	0	0	0	1	14	0
Columbus	1	1	0	0	0	0	0	9	0
Indiana:									
Fort Wayne	1	1	0	0	0	0	0	0	0
Indianapolis	2	1	0	0	0	0	0	1	0
South Bend	0	0	0	0	0	0	0	1	0
Terre Haute	0	0	0	0	0	0	0	1	0
Illinois:									
Chicago	1	0	0	1	0	0	3	6	0
Springfield	0	0	0	0	0	0	0	3	0
Michigan:									
Detroit	3	2	2	1	0	0	2	8	1
Wisconsin:									
Milwaukee	0	0	0	0	0	0	0	7	2
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	0	1	0	0	0	0	4	0
St. Paul	0	0	0	0	0	0	0	1	0
Iowa:									
Davenport	0	0	0	0	0	0	0	1	0
Des Moines	1	0	0	0	0	0	0	1	0
Sioux City	0	0	0	0	0	0	0	2	0
Missouri:									
Kansas City	1	1	0	0	0	0	0	8	0
St. Louis	1	0	0	0	0	0	0	0	0
South Dakota:									
Aberdeen	0	0	0	0	0	0	0	1	0
Sioux Falls	0	0	0	0	0	0	0	1	0
Nebraska:									
Lincoln	0	0	0	0	0	0	0	0	1
Omaha	0	0	0	0	0	0	1	1	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	0	2	1	0	1	3	0
District of Columbia:									
Washington	0	0	0	0	0	0	0	1	0
Virginia:									
Norfolk	0	0	0	0	0	0	0	1	1
North Carolina:									
Raleigh	0	0	0	0	1	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	4	0	0	0	0
Georgia:									
Atlanta	0	0	0	0	2	0	0	0	0
Savannah [1]	0	0	0	0	0	0	0	1	1
Florida:									
Miami	0	0	0	0	1	0	0	0	0
EAST SOUTH CENTRAL									
Kentucky:									
Covington	0	0	0	0	0	0	0	1	0
Tennessee:									
Memphis	0	0	0	0	0	1	0	0	0
Alabama:									
Birmingham	1	1	0	0	0	0	0	0	0

[1] Typhus fever, 4 cases: 1 case at New York, N. Y., and 3 cases at Savannah, Ga.

City reports for week ended October 18, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	0	0	0	0	0	0	0	0
Shreveport	0	0	0	0	0	5	0	0	0
Texas:									
Houston	0	0	0	0	0	0	0	2	0
MOUNTAIN									
Idaho:									
Boise	0	0	0	0	0	0	0	0	1
Colorado:									
Denver	0	0	0	0	0	0	1	1	0
Pueblo	0	0	0	0	0	0	0	1	0
Utah:									
Salt Lake	4	1	0	2	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	1	1	0
Tacoma	0	1	0	0	0	0	1	0	0
California:									
Los Angeles	3	0	0	0	0	0	1	12	0
San Francisco	0	1	0	0	0	1	1	24	1

[1] Typhus fever, 4 cases: 1 case at New York, N. Y., and 3 cases at Savannah, Ga.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended October 18, 1930, compared with those for a like period ended October 19, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, September 14 to October 18, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929
98 cities	47	75	58	83	[2] 62	97	72	112	71	135
New England	31	49	51	76	49	88	53	94	64	128
Middle Atlantic	38	54	33	60	43	62	42	75	35	88
East North Central	75	96	75	90	80	124	100	139	92	155
West North Central	47	64	57	100	[3] 62	108	66	123	74	167
South Atlantic	42	114	92	112	62	129	106	139	92	180
East South Central	27	137	34	137	115	157	108	232	162	171
West South Central	67	149	146	164	112	198	64	255	127	339
Mountain	26	70	60	26	[4] 9	26	43	0	17	70
Pacific	14	19	31	65	[5] 62	56	94	60	102	87

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930 and 1929, respectively.
[2] Kansas City, Mo., Great Falls, Mont., and Spokane, Wash., not included.
[3] Kansas City, Mo., not included.
[4] Great Falls, Mont., not included.
[5] Spokane, Wash., not included.

Summary of weekly reports from cities, September 14 to October 18, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

MEASLES CASE RATES

	Week ended—									
	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929
98 cities	16	15	18	13	[2] 19	16	22	22	36	30
New England	18	31	42	18	33	34	31	16	44	58
Middle Atlantic	17	7	13	10	12	12	16	12	23	17
East North Central	14	17	13	13	5	12	11	29	14	40
West North Central	19	6	28	10	[3] 73	10	76	23	140	31
South Atlantic	20	7	9	13	20	11	11	9	7	9
East South Central	0	7	74	0	0	0	20	14	7	0
West South Central	0	8	11	11	7	0	0	4	4	4
Mountain	43	26	26	44	[4] 73	35	112	61	189	52
Pacific	21	51	19	24	[5] 27	65	24	65	66	72

SCARLET FEVER CASE RATES

98 cities	62	68	72	95	[2] 74	102	97	114	123	138
New England	71	49	80	99	73	135	106	162	148	173
Middle Atlantic	47	25	33	42	49	48	54	48	90	69
East North Central	91	121	118	161	107	149	137	173	179	214
West North Central	44	92	76	108	[3] 73	119	91	140	114	173
South Atlantic	40	66	57	105	70	120	115	139	115	127
East South Central	40	28	128	75	74	82	182	123	148	232
West South Central	56	72	56	72	37	72	37	130	78	103
Mountain	69	113	94	139	[4] 118	131	283	148	232	157
Pacific	78	68	87	84	[5] 89	128	87	87	59	113

SMALLPOX CASE RATES

98 cities	5	5	3	4	[2] 1	7	2	7	2	12
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	1	0	0
East North Central	9	10	3	3	1	7	2	3	4	7
West North Central	21	6	13	8	[3] 0	2	6	13	0	21
South Atlantic	0	0	0	0	2	0	0	0	0	0
East South Central	0	0	0	0	0	48	0	0	0	0
West South Central	0	0	4	0	4	0	4	4	4	0
Mountain	0	52	0	96	[4] 0	52	0	96	26	122
Pacific	5	17	19	10	[5] 2	36	7	34	0	84

TYPHOID FEVER CASE RATES

98 cities	22	22	18	20	[2] 20	16	21	26	17	17
New England	11	13	11	7	11	11	20	16	9	9
Middle Atlantic	16	14	14	12	15	14	14	10	11	8
East North Central	11	11	9	9	9	12	9	8	7	10
West North Central	28	6	15	23	[3] 13	15	9	8	15	25
South Atlantic	62	26	51	17	38	30	64	26	57	24
East South Central	54	0	20	82	67	21	47	27	47	68
West South Central	67	84	37	27	56	8	52	27	22	15
Mountain	0	340	43	313	[4] 118	113	43	749	34	192
Pacific	17	7	14	10	[5] 20	10	19	7	26	19

[2] Kansas City, Mo., Great Falls, Mont., and Spokane, Wash., not included.
[3] Kansas City, Mo., not included.
[4] Great Falls, Mont., not included.
[5] Spokane, Wash., not included.

Summary of weekly reports from cities, September 14, to October 18, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

INFLUENZA DEATH RATES

	Week ended—									
	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929
91 cities	3	2	3	5	[6] 3	6	5	8	5	8
New England	2	2	2	2	0	4	4	0	7	2
Middle Atlantic	2	0	2	5	2	7	7	8	4	6
East North Central	3	2	2	4	1	5	3	8	4	9
West North Central	0	6	0	3	[3] 0	6	6	3	3	9
South Atlantic	0	2	4	6	2	7	2	11	5	9
East South Central	29	7	15	0	15	0	0	22	0	7
West South Central	8	0	4	12	11	16	11	16	8	16
Mountain	17	9	0	17	[4] 18	0	9	26	9	17
Pacific	0	9	6	3	3	9	0	6	9	6

PNEUMONIA DEATH RATES

	Sept. 20, 1930	Sept. 21, 1929	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929
91 cities	58	54	58	67	[6] 60	77	73	80	74	97
New England	51	29	35	72	40	36	64	74	80	97
Middle Atlantic	68	59	76	72	63	93	78	87	74	118
East North Central	43	47	48	54	54	61	55	65	51	81
West North Central	74	39	35	81	[3] 81	108	86	54	53	69
South Atlantic	51	66	51	60	48	81	79	103	88	81
East South Central	81	67	74	119	118	30	140	104	184	112
West South Central	60	51	77	94	77	113	119	113	96	90
Mountain	112	104	51	70	[4] 137	87	94	122	189	122
Pacific	49	57	49	38	49	47	49	57	80	82

[3] Kansas City, Mo., not included.
[4] Great Falls, Mont., not included.
[6] Kansas City, Mo., and Great Falls, Mont., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended October 18, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases in Canada for the week ended October 18, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		1	2		
New Brunswick					8
Quebec	1		1		48
Ontario	2	2	57	15	39
Manitoba	1		2		12
Saskatchewan			1		5
Alberta	2		7	1	6
British Columbia	1		6	1	17
Total	7	3	76	17	135

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended October 18, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended October 18, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Poliomyelitis	1
Chicken pox	44	Puerperal fever	1
Diphtheria	46	Scarlet fever	102
German measles	3	Tuberculosis	43
Influenza	3	Typhoid fever	48
Mumps	19	Whooping cough	45
Paratyphoid fever	3		

CHINA

Manchuria—Plague.—According to a recent report, 60 deaths from bubonic plague occurred during the month of August, 1930, in the Nunan district of Manchuria, and 40 additional cases of the disease were reported. In the region of the town of Kaitung, on the Taonan-Ssupingkai Railroad, many cases of plague occurred, and a severe epidemic was thought to exist in Inner Mongolia, far from the railroad.

All well-investigated outbreaks of plague which have occurred in the districts of Transbaikalia and Outer Mongolia, which border the Heilungchiang Province on the west, have been traced to the tarbagan

or Siberian marmot. Recently the existence of plague has been proved in some small rodents, notably the souslik (*S. dauricus* [*citellus*]) and the jerboas, but the relation of these to outbreaks of plague is still undetermined. Only isolated instances of plague infection have been discovered in rats. It is thought that the tarbagan flea (*Oropsylla silantiewi*), which is said to be capable of transmitting plague from the tarbagan to other susceptible animals and to man, is responsible for a great part of the human plague outbreaks in these sections.

It is stated that practically all of the early human cases of tarbagan origin have been of the bubonic type, with an unmistakable tendency of tarbagan-caused plague quickly to assume pneumonic characteristics—at first secondary and then primary in nature.

Tungliau—Taonan—Plague.—According to information dated September 24, 1930, received from the American Consul at Mukden, China, an outbreak of plague has occurred at two localities on Chinese railroads, viz., Tungliau, on the Tungliau-Tahushan Railroad, and near Taonan, at the terminus of the Ssupingkai–Taonan Railroad. The reports differ as to whether the type of the disease is bubonic or pneumonic.

CZECHOSLOVAKIA

Communicable diseases—August, 1930.—During the month of August, 1930, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	30	2	Puerperal fever	66	30
Cerebrospinal meningitis	14	4	Scarlet fever	1,441	37
Diphtheria	1,263	119	Trachoma	77	
Dysentery	170	9	Typhoid fever	711	45
Malaria	52		Typhus fever	1	
Paratyphoid fever	26				

LATVIA

Communicable diseases—July–August, 1930.—During the months of July and August, 1930, cases of certain communicable diseases were reported in Latvia as follows:

Disease	Cases		Disease	Cases	
	August	July		August	July
Anthrax		1	Poliomyelitis	13	9
Cerebrospinal meningitis	7		Puerperal fever	8	5
Diphtheria	60	47	Scarlet fever	107	103
Dysentery	10	1	Tetanus	2	2
Erysipelas	39	54	Trachoma	52	79
Influenza	50	67	Typhoid fever	142	143
Leprosy		4	Typhus fever	1	3
Measles	47	87	Whooping cough	89	122
Mumps	38	41			

PORTO RICO

San Juan—Communicable diseases—Five weeks ended October 18, 1930.—During the five weeks ended October 18, 1930, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	4	Tuberculosis	55
Malaria	2	Typhoid fever	3
Measles	1	Whooping cough	1
Tetanus	1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25
Afghanistan	C				[1] P				P									
China:																		
Amoy	C											1	1					
	D											1	1					
Canton	C		3	2	2													
	D				1													
Shanghai	C									8	4		22	23	5	6		
	D										1	1	1	2				
Shensi Province	C												P					
Swatow	C		3	7		1			2	1	1							
Tientsin	C								2	1								
India	C	41,462	56,311	37,102	26,121	7,199	11,597	11,993	12,104	14,249								
	D	27,906	44,878	25,711	13,822	3,676	6,033	6,345	6,304	5,879								
Bassein	C	7	7								1							
	D	5	5															
Bombay	C					3	2	3	6			1		1	3	1		
	D					2	1	1	4			2		1	2			
Calcutta	C	647	609	327	220	18	10	17	18	8	10		9	4	4	7		
	D	414	372	179	128	7	7	10	6	3	3		6	3	4	4		
Negapatam	C			1														
	D			1														
Rangoon	C	1	9	6	1	1				1	1					1		
	D	1	3	4	1	1				1						1		
India (French):																		
Chandernagor	C	6	6	3	1						1							
	D	5	6	2														
Karikal	C	1		3														
	D	1		3														
India: Portuguese	C							1			1							

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25
Indo-China (see also table below):																		
Pnompenh	C	2	1	40	32	5	3	3						1		1		
	D		5	18	22	3	2	1										
Saigon and Cholon	C	76	160	48	10	2	2	1						1				
	D	55	101	23	3		1											
Philippine Islands: [2]																		
Ports—																		
Cebu	C			1	65	5	4			1	1							
	D				36	4	4			1	1							
Iloilo	C				29	9	19	32	4	3	4	1	2	1				
	D				22	10	18	19	9	4	5	2	3	2			2	
Manila	C		1				1			16	13	10	4	2	1	2		
	D									5	6	1			1			
Provinces—																		
Antique	C					14	3		3	2	25	12	8	12		28		
	D					7	3		2	1	14	12	7	8		10		
Bohol	C						54	54	30	30	14	4	1					
	D						29	32	18	12	6	2						
Bulacan	C			3	4	1				1	2	1			2			
	D			1						1	1				1			
Capiz	C				3	1	1			1								
	D				2	1	1											
Cebu	C		1	355	713	55	26	4		1	16	8						
	D		1	170	303	32	15	3		1	6	4						
Iloilo	C			2	309	143	209	127	92	71	60	61	46	18	7	13	12	10
	D			1	193	77	143	91	65	45	45	35	26	15	6	7	12	7
La Union	C				1													
Leyte	C			47	11													
	D			19	11													
Masbate	C			10	92	15	19											
	D			3	35	5	9											
Misamis, Occidental	C				3													
	D				3													
Negros, Occidental	C		10	140	568	151	79	45	68	40	43	24	15	8	10	5	5	12
	D		7	88	368	97	64	33	43	32	30	20	9	6	5	6	3	12

Negros, Oriental	C				23	6	2											
	D				13	1	3											
Nueva Acija	C				1													
	D				1													
Pampanga	C			2	2					1								
Pangasinan	C				3	1												
	D				2	1												
Rizal	C			1	1													
	D			1	1													
Samar	C						5	3	10			3	1	4			3	6
	D						5	3	8			2		4			3	5
Surigao	C						15	2	11	1				(3)				
	D						9	2	6	2								
Tarlac	C					1												
Siam	C	29	33	27	20		1	1	1							1	3	
	D	13	21	19	9		1		1								1	
Bangkok	C	15	9	12	8			1								1	2	
	D	4	3	5	3			1								1	1	
Nagara Pathom	C	10																
	D	2																
Songkla	C				10													
	D				6													
On vessel:																		
S. S. Malwa from Shanghai	D												1					
S. S. Sassari at Massoua, from Jeddah	C		1															
	D		1															
On small boat at Port Cebu, from Bantayan Island	C			1														
	D			1														

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930			August, 1930			September, 1930			Oct. 1-10, 1930
						1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-30	
Indo-China (French) (see also table above):															
Annam [1]	C	52	60	23	16			1		3					
Cambodia [1]	C	81	24	88	144			43	37	22		23	13	2	16
Cochin-China [1]	C	82	48	671	273			46	22	5		9	6	18	14

[1] Reports incomplete.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, Philippine Islands.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25
Algeria:																		
Algiers	C				3		1		6	1	2	6	2	1	1	2	2	
Constantine	C			1	1													
Oran	C				3	1	1	1	1	1	2	3	4		4	4	2	
Philippeville	C										1			1		2	1	
Azores: Ponta Delgada	C	8																
	D	5																
Belgian Congo	C				2	1		1		2	3							
	D				2	1		1			3							
British East Africa (see also table below):																		
Tanganyika	C	44																
	D	20																
Uganda	C	117	227	406	228	52	67	62	55	44								
	D	105	195	328	213	50	64	62	73	37								
Canary Islands: Las Palmas	D						1											
Ceylon:																		
Colombo	C	1	6	1	3			1	1	2				1	1			
	D	1	5	1	3			1	1	3				1	1			
Plague-infected rats		4		1														
Chile: Antofagasta	C	1																
	D	1																
China: Manchuria—Tungliau and Nungan	C								30			29	P	2				
Dutch East Indies:																		
Batavia and West Java	C	87	82	98	84	19	30	20	14	13	14							
	D	81	82	98	84	19	30	20	14	12	14							
Plague-infected rats		8	5	4			1				1	1	1					
Java and Madura	D	173	185	202	217	45	51	47	45	55	54	67						
Ecuador (see table below).																		
Egypt:																		
Alexandria	C	2	13	19	23	2	2	4	3	3	3	2	2	2	1	3	3	2
	D	2	3	9	10	2	1	3		5	1	2		3	1	1	1	3
Assiout	C	14	20	9	2													
	D	5	5	3	2													
Beni-Suef	C								1									
Dakahlieh	C	5	11	1														
	D		2															

Gharbieh	C	1				3												
	D	1				1												
Girga	C	1			1					1								
Minieh	C		7	10	3													
	D		1	1														
Port Said	C	1	2	2	1	1												1
France:																		
Marseille	C									2	2	1					4	
St. Ouen	C				1													
	D				1													
Gambia	C								4									
	D								4									
Greece (see also table below):																		
Patras	C			1	1													
Pyrgos	C														2			
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats				1														
India	C	2,215	648	240	377	145	1·9	293	250	593								
	D	1,960	635	187	256	98	84	154	141	267								
Bassein	C									1		1						
	D									1		2						
Bombay	C	4	6	3	1						1			1				
	D	8	5	2	1						1				1			
Plague-infected rats		108	81	26	52	10	8	9	9	12	9	11	15	21	13	16		
Madras Presidency	C	44	38	39	47	35	21	7	18		47					7		
	D	19	11	22	31	13	9	1	11		23					9		
Rangoon	C	5	4	1	2	2	1			2	1	5	2	2				
	D	4	3	1	2	1	1			2	1	4	2	2				
Plague-infected rats		4	5	1	6	4		2	1	2		2	4		1			
India (Portuguese)	D		7					P										
Indo-China (see also table below):																		
Pnompenh	C	3	3	6	2		2		2	2	1			1	1			
	D	4	1	7	2									1	1	1		
Saigon and Cholon	C		1	2				1			1			1				
	D			1														
Iraq: Baghdad	C	6	37	28	18	4	3	2							1			
	D	2	18	15	7		2	1							1			
Japan: Osaka (vicinity of)—Plague-infected rats		3																
Kwang-Chow-Wan	C	37	34	31	4			1										
Madagascar (see also table below): Tamatave	C	1		1	1	2					1	P			1			
Morocco	C	121	71	3	1		8	7										
	D	45	34	4			1	1										
Nigeria: Lagos	C		2	5	1	2	1	3	1	1	1	3	1					
	D		2	5	1	2	1	3	1	1	1	3	1					
Plague-infected rats		7	17	11	18			4	4		4	2						
Senegal (see table below).																		
Siam	C	5	5			2	3		2	3								
	D	6	4			1	3		2	2								
Bangkok	C		5			1	2											
	D		4				2											
Nagara Pathom	C	10																
	D	9																
Nagara Rajsima	C	1				1			1		1							
	D	1				1			1		1							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25
Syria: Beirut	C			12	9		1		1	3	2							1
Tripolitania	C							2										
Tunisia:																		
Sfax district	C	1	21	9	6		1											
Tunis	C	4	1	1	5													
	D			1	1													
Union of Socialist Soviet Republics:																		
Salsk Region	C			2	5	4		3										
	D			1	4	3		2										
Stavropol Region	C			1														
	D			1														
Union of South Africa:																		
Cape Province	C		P	1	1				1				1					
	D				1			1				1						
Orange Free State	C	1								1		1						
	D									1		1						

Place		Apr., 1930	May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930
British East Africa (see also table above):							
Kenya	C	16	171	107	97	87	
Ecuador: Guayaquil	C	0	0	0			
	D	0	0	0			
Plague-infected rats		0	0	0			
Greece (see also table above)	C	1		1			
Indo-China (see also table above)	C	4		11	1	2	4
Madagascar (see also table above):							
Ambositra Province	C	14	1				
	D	12	1				
Antisirabe Province	C	46	19	3	24		
	D	45	19	3	24		
Miarinarivo Province	C	1	5	1	1		
	D	1	5	1	1		
Moramanga Province	C	3	1	3			
	D	3		3			
Madagascar—Continued.							
Tananarive Province	C	39	15	16	28		
	D	38	14	16	28		
Senegal:							
Baol [1]	C	24	13	2	62	79	48
	D	12	11	2	48	20	23
Dakar [1]	C	2	52	53	140	108	3
	D	2	42	117	122	90	8
Louga [1]	C	33	54	60	138	75	61
	D	10	27	21	103	33	30
Thies [1]	C	12	21	52	54	34	12
	D	9	8	35	30	20	4
Tivaouane [1]	C	71	135	43	119	110	20
	D	38	69	28	70	54	14

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930				August, 1930					September, 1930				October, 193		
					5	12	19	26	2	9	16	23	30	6	13	20	27	4	11	18
Algeria:																				
Algiers	C	1	3			1				1		2								
Constantine	C			1			1													
Arabia: Aden	C	1			1															
Bolivia: La Paz.[1]																				
British East Africa (see also table below):																				
Tanganyika	C	57	409	1,610	64	4		100	26	51	44	121	198	288		36				
	D	14	70	301	13	2		27	4		3	30	4	55		1				
British South Africa:																				
Northern Rhodesia	C	1	59																	
	D	2	9																	
Southern Rhodesia	C	66	155	79	1	12	18					1	1							
	D	1	13																	
Canada:																				
Alberta	C	4				2	1	2	1							1		13	8	1
Edmonton	C	3																		
British Columbia—Vancouver	C	17	4	2	2	2	1	1	1	1	2	2			1	1	1			1
Manitoba	C	4	10	4									1							
Ontario	C	77	82	47	3	5	6	10	8	3	5	4	2	2	6		1		3	15
North Bay	C		1																	
Ottawa	C	21	25	15	1	1	4	7	5	1	1		2	1	2					
Toronto	C		4	4		1									1					
Quebec	C			4	3					2	2	1								
Montreal	C								7											
Saskatchewan	C	41	39	22		2		3				8			1			3		
Regina	C		4																	
Ceylon: Angoda, Western Province	C	6																		
	D	2																		
China:																				
Canton	C	3																		
	D	3																		
Changking	C	P	P	1	P	P	P	P	P		P	P	P	P	P	P				
Foochow	C	P	P	P		P		P		P		P								
Hong Kong	C	18	12	4		2														
	D	23	9	3		1														

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930				August, 1930					September, 1930				October, 1930		
					5	12	19	26	2	9	16	23	30	6	13	20	27	4	11	18
China—Continued.																				
Manchuria—																				
Harbin	C	1	20	4				3			2									
Kwantung—Dairen	C	2	8	16	8															
	D		4	1																
Nanking	C	P	P	P		P	P	P	P	P	P	P	P	P	P					
Shanghai—																				
Foreigners only	C	3	2	5	1	1	1	1	3						18					
Including natives	D	10	5	3											2					
Swatow	D	3	6	4	1				1		2	1	1	1			1			
Tientsin	C	2	1																	
Chosen (see table below).																				
Colombia:																				
Barranquilla	C	1							2											
Buenaventura	C	15	4	6	4	3	2	1		1	1									
Costa Rica:																				
Port Limon	C	6	2	2																
San Jose [2]	C	7	2																	
Curacao (alastrim)	C	2	2	1	2						1									
Dutch East Indies:																				
Borneo	C	90	16	12		2														
	D	31	1	1																
Java—																				
Batavia and West Java	C	64	12	13	3	1	3	1	1	4	5	2	2		2	1			1	
	D	11	7	3	2	1	1	1	1	1	1	2	2		1				1	
East Java and Madura	C	4					1													
Sanggi Islands	C	160	26				11		36				14							
	D	24	5				3		2				3							
Egypt: Port Said	C	1	1			2		1												
France (see table below).																				
Great Britain:																				
England and Wales	C	1,427	1,417	926	156	138	126	109	70	86	95	93	99	106	75	61	82	74	44	
Ashton under Lyne	C	18	17	7		4	2	2												
Bradford	C	3	2		1													1		
Cardiff	C	3			2															

London	C	602	637	498	84	52	62	48	36	50	41	51	43	44	36	41	30	34	23	
London and Great Towns	C	1,066	1,078	753	127	96	102	83	61	73	71	80	79	84	51	54	55	56	32	
	D	3																		
Sheffield	C	2																		
Stoke-on-Trent	C	85	62	32	3	2	1	3	1	1					1	1			1	
Scotland	C			4		1								5						
	D					1														
Honduras: Naco	C														5					
India	C	34,843	22,835	12,962	2,258	2,006	1,853	1,513	11,313	1,282	1,236	1,046	830							
	D	6,983	5,451	3,531	733	580	577	458	368	327	290	261	202							
Bombay	C	430	218	113	17	15	11	7	6	2	2	2	2	1	1	2				
	D	270	161	79	13	9	9	2	5	2	1	2	2	1	2					
Calcutta	C	495	302	161	27	19	13	14	4		12	9	4	5	3	2	3	4	3	
	D	403	258	146	17	17	12	10	4		8	9	3	4	1	1	3	4	3	
Cochin	C	183	37	16			4	2	2	4	4	4	1	1		1			8	
	D	13	8	4									1						1	
Karachi	C	30	14	7				1	2		2				1	3				
	D	17	4	3					2		1					2				
Madras	C	133	72	35	6	10	17	16	19		9	10	9	11	6	8	4		8	
	D	27	15	10	4	1	3	4	3		5	3	1	1	1	3	1		3	
Moulmein	C	43	89	21	4	10	3	1				2	1							
	D	7	21	7	3	4	1	2				1			1					
Negapatam	C		1	2			1		2		2		1	2		6	4	2	5	
Rangoon	C	4	6	9	2	1	1		1	1	1									
	D		1	2																
Tuticorin	C		5	1																
Vizagapatam	C	6	5	1															1	
	D	2	3																	
India (French):																				
Chandernagor	C	10	24	19	3	1	4								1	2				
	D	2	7	3	1	1	1							1	1					
Karikal	C	19	12	11	1		1			8		1		5			1			
	D	8	3	8	1		1			8		1		2			1			
Pondicherry Province	C	24	40	23	4	9	8	5	7	8		7	11	7	7	10	11			
	D	20	36	23	3	9	8	5	7	8		7	11	7	7	8	11			
India (Portuguese)	C	44	47	28	1				1	6	1	1	1	2						
	D	8	8	10				1	1			1								
Indo-China (see also table below):																				
Pnompenh	C		3				1												2	
	D	2		1			1				1									
Saigon and Cholon	C	5	3	1						1			1							
	D	5	2						1	1	1		1							
Iraq:																				
Baghdad	C	8	1	1	1	1	1				1					1				
	D	1	1				1				1									
Basra	C	1																		
Mossoul Liwa	C	22	21	4	47	20											63		4	2
	D	3	3	1	19	1											27			

[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica, outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930 5	July 12	July 19	July 26	August, 1930 2	Aug. 9	Aug. 16	Aug. 23	Aug. 30	September, 1930 6	Sept. 13	Sept. 20	Sept. 27	October, 1930 4	Oct. 11	Oct. 18
Ivory Coast (see table below).																				
Jamaica (alastrim)	C		2																	
Japan: Tokyo	C	1																		
	D	1																		
Macao	D	2	1																	
Mexico (see also table below):																				
Jalisco (State) Guadalajara	D	20	7	15	3	1				1								2		1
Juarez	C			6						2							1			
	D			1						1										
Mexico City and surrounding territory	C	99	80	77	10	12	4	11	2	3	3	2	7	2	1	2	1	3		
	D	47	32	17	2	3	1	2	1	3	2		1	1	1	2				
Progreso	C		1																	
	D		1	1																
Morocco (see table below).																				
Nigeria: Lagos	C	1		1																
Poland	C	7	3	2																
Portugal:																				
Lisbon	C	8	8	10		7		6		6	19	25	7	8		12	4	5		
Oporto	C											1								
Siam	C	8	2		2		4													
	D	4					3													
Somaliland, British: Boales	C																	1		
	D																	1		
Spain	C			12		1	1	3	2					4	1					
Straits Settlements	C	5	11	9	1	2	7	1	1	1	5	1	1	2	2	1	1	1	1	
	D	2	3	2	1	1	1			1	1	1		1					1	
Sudan (Anglo-Egyptian)	C	42	19	67	8	1		3				42	102	5	20	1	25	1	56	
	D	4	2	3		1						3	50	2			2		5	
Sudan (French) (see table below).																				
Switzerland: Berne Canton	C							1	1	1							1			
Syria (see table below).																				
Taiwan: Taihoku (see table below).																				
Tunisia: Tunis	C	4	2	2				1								2				
Turkey (see table below).																				

Union of South Africa:																				
Cape Province	C	P	P					P						P		P				
Orange Free State	C						P	P	P											
Transvaal	C									P	P	P	P	P	P					
Upper Volta	C	3	1	13																
On vessel:																				
S. S. Elysia, at Port Sudan, from Bombay	C	1																		
S. S. Naldera, at Port Said	C		1																	
S. S. Manoa, from Honolulu to San Francisco	C				1															

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930			August, 1930			September, 1930			Oct. 1-10, 1930
						1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-30	
Indo-China (see also table above)	C	26	261	305	213			238	59	34		54	52	86	32
Ivory Coast	C	7													
Sudan (French)	C	609	521	274	76		34				39		P		
	D	49	36	32	18						3				
Syria: Beirut	C	17	19	7	7			2	1						
Taiwan: Taihoku	C	58	12												

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
British East Africa (see also table above):							
Kenya	C	175	174	171	142	186	
Uganda	C			78			
	D			69			
Chosen	C	236	253	107		3	
	D	53	53	35			
Seishin	C		5	2	1	2	
	D		1	1			

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
France	C	8	58	51			
Mexico: Durango (see also table above)	D	5	4	4	3	3	3
Morocco	C	17	10	18	5	3	
Turkey	C		3	16			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	Week ended— July, 1930 5	12	19	26	August, 1930 2	9	16	23	30	September, 1930 6	13	20	27	October, 1930 4	11
Algeria:																			
Algiers	C	8	15	3		1	2	3				2		3					
Constantine Department	C	15	6	12		1	1					3						2	
Oran	C		3	4		2	1			1			1						1
Bolivia: La Paz.[1]																			
Brazil: Porto Alegre	C		1																
Bulgaria	C	15	6	16		4	5	1		1				2	2		2		1
	D	1	2	1			1												
China:																			
Manchuria—Harbin (see also table below)	C	52	13	8	2				2				2						
Shanghai	C									1									
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C	1		1	1						1			1	1		1		
Beheira Province	C	2	49	45		5	1	9								1			
	D		13	4		1		1											
Cairo	C								2			5			1				
Port Said	C											4		1				1	
Great Britain: Scotland—																			
Dunfermline	C					1													
Glasgow	C		1																
	D		1																
Greece (see table below)																			
Ireland:																			
Irish Free State—																			
Galway County—Oughterard	C							2											
Kerry County—Dingle	C	5																	
Leitrim County—Mohill	C			9				1											
Mayo County—																			
Ballina	C		2	1		1													
Castlebar	C											1							
Swinford	C		14																
Westport	C						2		1										

Roscommon County—																			
Roscommon	C						1												
Strokestown	C						1												
Wicklow County—Shillelagh	C			4	1		1												
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico:																			
Durango	D															1	1		1
Mexico City, including municipalities in Federal District	C	4	6	9	2		2	1	2	2	2	3	2	2	3				
	D	4	3	1					1	1				1	1				
Morocco	C	15	11	15		4	3	4				8		2					
	D	3																	
Palestine	C	1	2	2	3	1	1	1		1	1	1		1	1	1		1	1
Poland	C	243	171	117		24		12	10	15	2	7	2	3	6	12	3	6	6
	D	15	5	11		4			1		1	1		1			1		
Portugal:																			
Lisbon	C	4																	
Oporto	C	1									1							1	1
Rumania	C	186	227	58	11	10	3	4	5		2	2	1						
	D	11	35	5	5	2	1		2										
Spain: Valencia	C			3		3									1				
	D					1									1				
Tunisia	C		6	18			14	10	2	5		3	1	1		4	1	1	1
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P			
Natal	C	P	P	P	P	P	P	[1]	P	P	P				P				
Orange Free State	C		P	P	P	P	P	P	P	P	P	P	P	P	P				
Transvaal	C	P					P		P		P		P	P	P				
Yugoslavia (see table below).																			

Place		Apr., 1930	May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930
China: Harbin (see also table above)	C	204	240		14	5	
Chosen: Seoul	C	3	43	2	3	2	
Czechoslovakia	C	29	12	1		1	
Greece: Athens	C	1	3	3	6	6	
Latvia	C		3	3	3	1	

Place		Apr., 1930	May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930
Lithuania	C	73	27	16	18		3
	D	4					
Turkey	C	3	16	2		2	
Yugoslavia	C	22	16	6			
	D	4	1				

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Ry., between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2

	Cases
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

X

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

VOL. 45 NOVEMBER 14, 1930 NO. 46

THE ESSENTIALS OF SMALLPOX VACCINATION[1]

By JAMES P. LEAKE, *Surgeon*, and JOHN N. FORCE, *Special Expert, United States Public Health Service*

THE VACCINATION REACTION

When potent smallpox vaccine is applied below the superficial layers of the epidermis, irrespective of the method used for penetrating these layers, a reaction will take place, reaching a maximum which may be observed in from 1 to 14 days, depending on the degree of immunity of the subject. *Absence of this reaction indicates that the vaccine is incapable of protecting against smallpox, and not that the subject is immune.* Any one of the forms of this vaccination reaction, to be described below, is evidence of a successful vaccination.

If the subject has never been immunized by smallpox or by previous vaccination, the reaction will manifest itself as a primary *vaccinia.* A *papule* appears at the inoculation site from one to six days following the vaccination. This becomes vesiculated from one to three days later, the vesicle being surrounded by a narrow red margin or *areola.* This vesicle increases in diameter at the rate of approximately a millimeter a day. On about the seventh day the skin outside the areola begins to turn red; and this *area* of redness rapidly extends until the eighth to fourteenth day (usually the ninth or tenth), when the maximum diameter of the area is reached. After this day, the area rapidly fades, and the vesicle, already crusted in the center, extends slightly for a day or two, and then is soon completely replaced by a dark brown crust, though still surrounded for some days by a narrow areola. If kept dry, the *crust* will separate in approximately three weeks from the day of vaccination, leaving a red *scar*, which becomes white in a year or so. For a day or two during the development of the area, the axillary lymph nodes are usually swollen and tender, and fever and headache are generally present. All these symptoms abate promptly, often before the maximum of the local reaction is reached.

If the subject retains partial immunity, either through previous vaccination or an attack of smallpox, the reaction will be accelerated

[1] Revision of Reprint No. 686 from Public Health Reports, Vol. 36, No. 33, pp. 1975-1978, Aug. 19, 1921

in development, shortened in time, and decreased in severity. The papule will appear earlier, the vesicle will be smaller, and the area will be less extensive at the maximum of the reaction, which may occur at any time from four to seven days after vaccination. In this event the reaction is considered a *vaccinoid* (accelerated reaction or secondary vaccinia).

If the immunity is very high, the acceleration may be so great that the reaction consists only of a papule and areola, with the maximum diameter in from 8 to 72 hours after vaccination. In this case the reaction is designated *reaction of immunity* (immediate reaction). The time element of this reaction is of prime importance. If the papule and areola do not appear until the third day and *there is no vesiculation,* the reaction is not that of immunity but is due to an impotent vaccine, and the vaccination should be repeated with a fresh lot. Also with vaccine of less than full potency, a reaction similar to a reaction of immunity may be produced in a person who is not fully immune. This can not be considered a successful vaccination.

NECESSITY FOR KEEPING VACCINE VERY COLD

The expiration date on a package of smallpox vaccine indicates its expectancy of moderate potency under ordinary conditions. For reading reactions of immunity and for vaccinating persons actually exposed to smallpox, vaccine of full potency should be used, and the temperature of storage should therefore be lower than the upper limit stated on the package. Smallpox vaccine can not be kept too cold; it deteriorates even in an ice box. The freshest possible vaccine should be obtained; and this can be secured by arranging for small and frequent shipments direct from the manufacturing laboratory. The packages should be kept in the ice-making compartment of a refrigerating machine, or if a mechanical refrigerator is not available, in constant contact with ice, not merely on a shelf in an ice box. Metal or glass containers for storing in ice are convenient; but if there is occasional access to outside air, or changes in temperature, needles (except those in glass-sealed tubes) should be removed from the packages to prevent rusting. For use in the field, large quantities should be transported in ice-cream freezers, small quantities in rubber-stoppered test tubes, packed with shaved ice in the inner compartments of vacuum bottles. A good vacuum bottle will keep vaccine packed in this way ice cold up to 24 hours.

PREPARATION OF THE SITE FOR VACCINATION

The skin of the upper arm in the region of the depression formed by the insertion of the deltoid muscle should be gently but thoroughly cleansed with acetone on sterile gauze or cotton and wiped or allowed

to dry for a few seconds. Acetone is suggested as a cleansing agent rather than alcohol for the following reasons:

1. It is a more efficient cleanser.
2. It is cheaper.
3. It is not denatured with substances which may possibly affect the vaccination result.
4. It evaporates more rapidly.
5. Approximately 200 vaccinations performed after the use of acetone and alcohol on alternate subjects resulted in more successful vaccinations with acetone than with alcohol.

METHODS OF VACCINATING

1. *The multiple pressure method.*—In each package of capillary tubes there will be found a perforated rubber bulb with a diaphragm across the interior of the neck. Push an unbroken capillary tube through the neck of the bulb until about a quarter of an inch of the capillary tube appears beyond the bulb. Break the tip which has been pushed through and withdraw the tube until the broken end lies in the neck of the bulb. With sterile gauze, break the other tip of the capillary tube and drop the contents on the spot to be vaccinated by squeezing the bulb with the finger over the perforation.

The needle, which should be new, sharp, and sterile, is held parallel to the skin, with the forefinger and middle finger of the right hand above the needle and the thumb below, the needle pointing to the operator's left. The needle should be crosswise of the arm, so that the thumb of the operator does not interfere by hitting the skin. The *side* of the needle point is then pressed *very firmly* and rapidly into the drop about thirty times within five seconds (ten times for primary vaccinations), covering an area *not over one-eighth of an inch* in diameter. The area covered by the pressures can be kept small by steadying the last two fingers of one's hand against the arm of the person being vaccinated and by moving the hand from the wrist only. This rapid up-and-down motion of lifting the needle and pressing it against the skin should be quite perpendicular to the skin and needle and not in the direction of the long axis of the needle. The point is not driven into the skin, but at each pressure the elasticity of the skin will pull a fraction of an inch of the epidermis over the point of the needle so that the vaccine is carried into the deeper layers of the epidermis. If the skin has not been unduly rubbed in cleansing and if the pressure is entirely perpendicular to the needle, no signs of bleeding should occur and all evidence of trauma will fade out in less than six hours. Immediately after the pressures have been made, the remaining vaccine is gently wiped off the skin with sterile gauze and the sleeve pulled down, the whole operation of pressing and wiping taking less than 10

seconds—it is not necessary to rub the vaccine in, as with the other two methods.

The advantages of this method are its mildness and painlessness, the fact that it is more rapid than any other effectual and safe method, the very superficial implantation, the leaving of the epidermis nearly intact, the fact that no control site is necessary for estimating the amount of trauma in a reaction of immunity (since the evidence of trauma due to the operation has usually disappeared before the first observation for an early reaction is made), and the fact that the vaccine is wiped off immediately so that the uselessness of a dressing is obvious to the person vaccinated.

2. *The method of incision or linear abrasion.*—The vaccine is dropped on the skin as described for the multiple-pressure method. The underside of the arm is then grasped with the vaccinator's left hand, in order to stretch the skin where the vaccine has been dropped. This tension is maintained while the vaccine is being inserted. With the point of a sterile needle pressed through the drop of vaccine "*a very slight scratch, not exceeding the eighth part of an inch*" (Jenner), is made down the arm. With the side of the needle or the flat end of a sterile toothpick, the vaccine is then gently rubbed across the scratch for at least 15 seconds.[2] The scratch should penetrate the epidermis, but not draw blood. The friction across the scratch may cause a slight oozing of blood-tinged serum, but this should not be sufficient to wash the vaccine out of the scratch.

3. *The drill method.*—In the drill method the epidermis is perforated by a small drill with a sharp cutting edge 2 mm. in width. The drill is made of carbon steel and the tip can be sterilized by flaming. The drill method is preferable for quantitative investigations or where there is a tendency to vaccinate too large an area, because of the uniformity of size of insertion.

If in capillary tubes the vaccine is prepared for insertion as previously described, but is not dropped on the skin until after the derma has been exposed. The skin is tightly drawn and the drill pressed against it perpendicularly. A single rotary turn is then made without altering the pressure. This will detach a small flake of epidermis, which should be brushed off with the edge of the drill. This exposes a circle of derma about 2 mm. in diameter and, if skillfully done, should cause no bleeding. The vaccine is dropped on this circle of exposed derma and rubbed in with a sterile toothpick, as described under the method of incision.

If the number of persons being vaccinated is large enough to warrant the expenditure of all the vaccine in a vial container at one clinic period, the vaccine may be supplied in vials and transferred directly to the arm with the sterile toothpick.

[2] This recommendation is based on the results of a series of tests with different vaccines.

NUMBER OF INSERTIONS

Multiple insertions should be used under the following conditions:

1. In case of exposure to smallpox.
2. In case of failure of previous vaccination.
3. In case there is any doubt as to the full potency of the vaccine on account of possible adverse conditions of transportation or storage.
4. In case the subject is not likely to return for revaccination in the event of failure.

When multiple insertions are used, they should be made not less than 2.5 cm. apart. A capillary tube should be used to each insertion.

PRECAUTIONS

The vaccination site should not be exposed to direct sunlight until dry. *Dressings are unnecessary and are harmful if permitted to remain on the arm.* The small vesicles produced by any one of the above methods are reasonably tough and will dry without rupturing unless macerated by the excessive heat and moisture present under a vaccination shield or other nonmobile covering. This maceration is not prevented by the presence of openings in the vaccination shield. Vesicles and crusts should be kept dry. If necessary to prevent the soiling of the clothing, a fold of sterile gauze may be attached to the garment, not to the skin. Very rarely a severe "take" may require a few days of antiseptic dressings.

All primary vaccinations should be observed at the end of 10 and 15 days, and revaccinations should be observed in 2 and 4 days, in order to detect a possible reaction of immunity. *The vaccination should be considered successful as soon as this reaction of immunity appears and begins to subside,* provided vaccine of full potency has been used. A test for full potency is that the vaccine should give more than 50 per cent of vaccinoid reactions in the group of people vaccinated more than 10 years previously.

Small insertions are insisted upon because the diameter of the lesion is dependent upon the area of the insertion, and the rapidity of healing is dependent upon the size of the lesion.

THE VACCINATION CERTIFICATE

The character of the vaccination reaction should be indicated on the vaccination certificate by noting *the day of greatest extent of redness.* This may be done conveniently by checking the day on the following record:

	Reaction of immunity	Vaccinoid	Vaccinia
Days after vaccination	1 2 3	4 5 6 7	8 9 10 11 12 13 14

Encircle the number of the day after vaccination on which the greatest extent of redness was observed.

The number of successful insertions, the lot number of the virus, and the expiration date should also appear on the record.

STATE AND INSULAR HEALTH AUTHORITIES, 1930

DIRECTORY, WITH DATA AS TO APPROPRIATIONS AND PUBLICATIONS

Directories of the State and insular health authorities of the United States for each year from 1912 to 1929 have been published in the Public Health Reports [1] for the information of health officers and others interested in public-health activities. The present volume (1930), like those formerly issued, has been compiled from information furnished by the respective State and insular health officers, and includes data as to appropriations and publications.

Where an officer has been reported to be a "whole-time" health officer, that fact is indicated by an asterisk (*). For this purpose a "whole-time" health officer is defined as "one who does not engage in the practice of medicine or in any other business, but devotes all of his time to official duties."

ALABAMA

Board of censors of the medical association of the State of Alabama, acting as a committee of public health:
- Bibb Graves, governor, ex officio chairman, Montgomery.
- W. D. Partlow, M. D., chairman, Tuscaloosa.
- R. S. Hill, M. D., Montgomery.
- Fred W. Wilkerson, M. D., Montgomery.
- D. T. McCall, M. D., Mobile.
- W. W. Harper, M. D., Selma.
- J. S. McLester, M. D., Birmingham.
- M. Y. Dabney, M. D., Birmingham.
- A. L. Harlan, M. D., Alexander City.
- S. A. Gordon, M. D., Marion.
- J. M. Watkins, M. D., Troy.

Executive health officer:
- *J. N. Baker, M. D., State Health Officer, Montgomery.

Administrative assistant:
- *D. L. Cannon, M. D., Montgomery.

Secretary to State health officer:
- *Bessie Tucker, Montgomery.

Financial secretary:
- *Adna Eley Alldredge, Montgomery.

Registrar of vital statistics:
- *W. T. Fales, Montgomery.
- *Ethel Hawley, chief clerk, Montgomery.

Laboratories of the State Board of Health:
- General director—
  - *L. C. Havens, M. D., Montgomery.
- Assistant director—
  - *Catherine R. Mayfield, Montgomery.
- Anniston branch—
  - *Katie Mae Wilson, Anniston.
- Birmingham branch—
  - George A. Denison, Birmingham.
- Mobile branch—
  - *C. H. Waite, Mobile.
- Tennessee Valley—
  - *A. J. Perolio, M. D., Albany.
- Tuscaloosa branch—
  - *Lucile Watt, M. D., Tuscaloosa.
- Selma branch—
  - *Nellie K. Whitfield, Selma.

State sanitary engineer:
- *G. H. Hazlehurst, C. E., M. C. E., Montgomery.

Assistant sanitary engineers:
- *H. G. Menke, B. C. E., Montgomery.
- *C. C. Kiker, B. C. E., Montgomery.
- *T. H. Milford, B. C. E., Montgomery.

Communicable disease control:
- *D. G. Gill, M. D., D. P. H., director, Montgomery.
- W. E. Wilson, M. D., C. P. H., assistant director, Montgomery.

[1] Reprints Nos. 83, 123, 190, 286, 344, 405, 488, 544, 605, 706, 775, 871, 949, 1,043, 1,106, 1,188, 1,254, and 1,334, from the Public Health Reports.

County organization:
Divisional directors—
*C. L. Murphree, M. D., Montgomery.
*B. F. Austin, M. D., Montgomery.
Director field training station:
A. H. Graham, M. D., D. P. H., Opelika.
Director in public health nursing:
Mary I. Mastin, R. N., Opelika.
Public health nursing:
*Jessie L. Marriner, R. N., director, Montgomery.
*Frances C. Montgomery, R. N., assistant director, Montgomery.
*Annie Jewel Brown, R. N., assistant director, Montgomery.
Margaret Murphy, R. N., assistant director, Montgomery.
Catherine Corley, R. N., assistant director, Montgomery.
Inspection:
*C. A. Abele, Ch. E., director, Montgomery.
*H. J. Thrasher, assistant director, Huntsville.
*U. D. Franklir, dairy inspector, Huntsville.
*F. H. Downs, dairy inspector, Montgomery.
*J. W. Garrett, dairy inspector, Selma.
*H. W. Caldwell, D. V. M., dairy inspector, Montgomery.
*D. Cook, D. V. M., dairy inspector, Montgomery.
*C. G. Allen, dairy inspector, Montgomery.
*C. H. South, district inspector, oyster control, Mobile.
*B. F. Crane, district inspector, Birmingham.
*B. S. Coon, district inspector, Montgomery.
Appropriation for fiscal year ending September 30, 1930:

Central administration	$193,813
County health work, per county	2,500
Inspection of dairy plants	12,000

ALASKA

Board of health:
George A. Parks, governor, Juneau.
Harry C. De Vighne, M. D., commissioner of health, Juneau.
Executive health officer:
Harry C. De Vighne, M. D., commissioner of health, Juneau.
Assistant commissioners of health:
F. J. O'Hara, M. D., Nome.
J. A. Sutherland, M. D., Fairbanks.
Appropriation for 1927–28, $18,100.

ARIZONA

State board of health:
John C. Phillips, governor, president, Phoenix.
K. Berry Peterson, attorney general, vice president, Phoenix.
R. J. Stroud, M. D., secretary, Tempe.
Executive health officer:
***R. J. Stroud, M. D.**, State superintendent of public health, Tempe.
*O. C. West, M. D., epidemiologist, Phoenix.
Executive secretary:
* Maud J. Tansey, Phoenix.
State registrar of vital statistics:
*R. J. Stroud, M. D., Tempe.
State bureau of vital statistics:
*Anna M. Galbraith, Phoenix.
State laboratory:
*Jane H. Rider, director, Tucson.
*Marion E. Stroud, bacteriologist, Tucson.
Appropriations for the years ending June 30, 1930 and 1931:

State board of health—	
Salaries	$12,800
Operating expense	5,450
Traveling expense	2,500
Capital investment	500
Repairs and replacements	150
Total for one year	21,400
Total for two years	42,800
State laboratory—	
Salaries	6,840
Operating expense	700
Traveling expense	900
Capital investment	500
Total for one year	8,940
Total for two years	17,880

ARKANSAS

Board of health:
E. L. Watson, M. D., president, Newport.
O. L. Williamson, M. D., Marianna.
A. S. Gregg, M. D., Fayetteville.
R. M. Eubanks, M. D., Little Rock.
L. D. Duncan, M. D., Waldron.
W. P. Parks, M. D., Hot Springs.
F. O. Mahony, M. D., El Dorado.
Executive health officer:
***C. W. Garrison, M. D.**, State health officer, Little Rock.
Bureau of vital statistics:
*Mrs. Mary Ellis Brown, statistician, Little Rock.
Hygienic laboratory:
*H. V. Stewart, associate director, Little Rock.
Bureau of sanitation and malaria control:
*M. Z. Bair, chief sanitary engineer, Little Rock.
Bureau of child hygiene:
*C. W. Garrison, M. D., director, Little Rock.
County health units:
*Gordon Hastings, M. D., director, Little Rock.
Appropriations for biennial period ending June 30, 1931:

Executive department, salaries and miscellaneous	$31,600
Bureau of vital statistics	36,800
Payment of local registrars	31,000
Malaria control	9,760
Bureau of sanitation	28,400
Bureau of child hygiene	3,000
Hygienic laboratory	21,240
County Health units	10,000
Total	171,800

CALIFORNIA

Board of public health:
- George E. Ebright, M. D., president, San Francisco.
- Fred F. Gundrum, M. D., vice president, Sacramento.
- Walter M. Dickie, M. D., director of public health, Sacramento.
- A. J. Scott, jr., M. D., Los Angeles.
- Edward F. Glaser, M. D., San Francisco.
- Adelaide Brown, M. D., San Francisco.
- Robert A. Peers, M. D., Colfax.

Department of public health:
- *Walter M. Dickie, M. D., director of public health, Sacramento.

District health officer:
- *Gavin Telfer, M. D., southern division.

Chief sanitary inspector:
- *Edward T. Ross, Sacramento.

Chief cannery inspector:
- *Milton P. Duffy, San Francisco.

Vital statistics:
- *Mrs. Marie B. Strassburger, registrar, Sacramento.

Bureau of registration nurses:
- *Sarah G. White, R. N., chief, Sacramento.

Bureau of tuberculosis:
- *Edythe L. M. Tate-Thompson, chief, Sacramento.

Bureau of food and drugs:
- *M. E. Jaffa, chief, Berkeley.

Bacteriological laboratory:
- *W. H. Kellogg, M. D., chief, Berkeley.

Bureau of sanitary engineering:
- *C. G. Gillespie, C. E., chief, Berkeley.

Bureau of child hygiene:
- *Ellen S. Stadtmuller, M. D., chief, San Francisco.

Malaria control:
- *Edward Stuart, C. E., in charge.

Appropriations for biennial period ending June 30, 1931 (for eighty-first and eighty-second fiscal years):

Administration—	
For support, department of public health	$569, 500
Aid to mosquito abatement districts	10, 000
Division of cannery inspection—	
For support	148, 720
(Payable from cannery inspection funds.)	
Nurses' registration bureau—	
For support	86, 680
Tuberculosis bureau—	
Allotment for support, $47,900 included in item "for support, department of public health."	
For subsidies	640, 000
Orthopedics survey for aid to physically defective children	8, 200
Total	1, 413, 100

Other sources of revenue:
- Fees for registration of nurses, $10 each.
- Renewal of registration certificates, $1 per year.
- Licensing of cold-storage warehouses, rated according to capacity.
- Fines for violation of pure food and drugs act.
- Fees for licenses, $10 each, and contributions, for credit to division of cannery inspection.
- Fees for certified copies of records.

Publications issued by health department:
- Biennial report.
- Weekly bulletin.

COLORADO

Board of health:
- Sherman Williams, M. D., president, Denver.
- S. R. McKelvey, M. D., secretary, Denver.
- J. S. Hasty, M. D., Lamar.
- Ben Beshoar, M. D., Trinidad.
- Paul J. Connor, M. D., Denver.
- Ralph M. Jones, D. O., Denver.
- C. A. Davlin, M. D., Alamosa.
- Charles W. Thompson, M. D., Pueblo.
- William P. Gasser, M. D., Loveland.

Executive health officer:
- *S. R. McKelvey, M. D., secretary, State board of health, Denver.

Bacteriologist:
- William C. Mitchell, M. D., Denver.

Epidemiologist:
- W. H. Twining, M. D., Denver.

State food and drug commissioner.
- *S. H. Loeb, Denver.

Division of social hygiene:
- *S. R. McKelvey, M. D., director, Denver.

Division of sanitary engineering:
- *Benjamin V. Howe, director, Denver.

Division of plumbing inspection:
- *Irving H. Fuller, inspector, Denver.

Appropriations for fiscal years ending June 30, 1930 and 1931:

	1930	1931
Salaries	$27, 300	$27, 300
Laboratory equipment and supplies	2, 000	2, 000
Printing and publications	2, 800	2, 800
Traveling expenses	5, 000	5, 000
Samples and supplies (food)	300	300
Venereal disease	20, 000	20, 000
Incidental expenses	1, 750	1, 750
Total	59, 150	59, 150

CONNECTICUT

Public health council:
- S. B. Overlock, M. D.
- C. E. A. Winslow, D. P. H.
- James W. Knox.
- Edward P. Jones.
- James A. Nowlands.
- David R. Lyman, M. D.

Executive health officer:
- *Stanley H. Osborn, M. D., C. P. H., commissioner of health, Hartford.

Bureau of preventable diseases:
- *Millard Knowlton, M. D., C. P. H., director.

Bureau of vital statistics:
- *William C. Welling, director.

Bureau of public-health nursing:
*Sarah R. Addison, R. N., director.
Bureau of child hygiene:
*A. Elizabeth Ingraham, M. D.
Bureau of public-health instruction:
*Elizabeth C. Nickerson, C. P. H.
Bureau of laboratories:
*F. Lee Mickle, director.
Bureau of sanitary engineering:
*Warren J. Scott, director.
Division of occupational diseases:
*Albert S. Gray, M. D.
Division of venereal diseases:
*Henry P. Talbot, M. D.
Division of mental hygiene:
*James L. McCartney, M. D., chief.
Division of mouth hygiene:
Clyde R. Salmons, D. D. S., chief.
Division of medical registration:
*Ruth H. Monroe, chief.
Appropriation for fiscal period ending June 30, 1931 (two years), $648,619.
Publications issued by health department:
Weekly bulletin.
Monthly bulletin.
Annual vital-statistics report.
Annual report of State department of health.
Miscellaneous pamphlets.

DELAWARE

State board of health:
William P. Orr, M. D., president, Lewes.
Mrs. Charles Warner, vice president, Wilmington.
Robert E. Ellegood, M. D., Wilmington.
Margaret I. Handy, M. D., Wilmington.
Mrs. F. G. Tallman, Wilmington.
W. R. Pierce, M. D., Milford.
Mrs. Arthur Brewington, Delmar.
Charles R. Jefferis, jr., D. D. S., Wilmington.
Executive health officer:
*Arthur C. Jost, M. D., C. M., Dover.
Director of laboratory:
*Rowland D. Herdman, Dover.
Director of child hygiene:
*Clealand A. Sargent, M. D., Dover.
Sanitary engineer:
*Richard C. Beckett, Dover.
Superintendent of Brandywine sanatorium:
*Lawrence D. Phillips, M. D., Marshallton.
Superintendent of Edgewood sanatorium:
*Elizabeth Van Vranken, R. N., Marshallton.
Appropriations for each fiscal year ending June 30, 1930 and 1931:

General administration	$75,000
Hygienic laboratory	9,000
Edgewood sanatorium for colored tuberculous patients	14,000
Brandywine sanatorium for white tuberculous patients	40,000
Total	138,000
Permanent improvement of Brandywine sanatorium for white tuberculous patients (1930)	35,000
Special vote for Brandywine sanatorium	15,000

Publications:
Biennial report.
Bi-monthly health news.
Bulletins on health subjects.

DISTRICT OF COLUMBIA

Executive health officer:
*William C. Fowler, M. D., health officer, Washington.
Assistant health officer:
*Edward J. Schwartz, M. D., Washington.
Chief clerk and deputy health officer:
*Arthur G. Cole, Washington.
Chief, bureau of preventable diseases, and director bacteriological laboratory:
*James G. Cumming, M. D., Washington.
Bacteriologist:
*John E. Noble, Washington.
Serologist:
*Jesse P. Porch, D. V. M., Washington.
Chemist:
*John B. Reed, Washington.
Chief sanitary inspector:
*J. Frank Butts, Washington.
Director child hygiene service:
*Hugh J. Davis, M. D., Washington.
Chief food inspector:
*Reid R. Ashworth, D. V. S., Washington.
Chief medical and sanitary inspector of schools:
*Joseph A. Murphy, M. D., Washington.
Appropriations for the fiscal year ending June 30, 1931:

Salaries	$187,790
Prevention of communicable diseases	48,000
Isolation wards at hospitals	24,000
Milk and food inspection and regulation	8,300
Dispensary service, including treatment of tuberculosis and venereal diseases	29,000
Maintaining a child hygienic service	54,000
Hygiene and sanitation, public schools	101,980
Laboratory service	4,450
Miscellaneous	13,250
Total	470,770

Publications issued by health department:
Weekly report by health department.
Annual report of health officer.
Monthly statement of average grade of milk sold.

FLORIDA

Board of health:
Chas. H. Mann, president, Jacksonville.
H. Mason Smith, M. D., Tampa.
W. D. Nobles, M. D., Pensacola.
Executive health officer:
*Henry Hanson, M. D., State health officer, Jacksonville.
Diagnostic laboratories:
*Paul Eaton, M. D., D. P. H., acting director, Jacksonville.
Bureau of vital statistics:
*Stewart G. Thompson, D. P. H., director, Jacksonville.

Bureau of communicable diseases:
*F. A. Brink, M. D., director, Jacksonville.
Bureau of sanitary engineering:
*E. L. Filby, C. E., director, Jacksonville.
Bureau of child hygiene and public health nursing:
*Lucile Spires Blachly, M. D., director, Jacksonville.
Appropriation for health department:
One-half mill tax levied upon the assessable property of the State for the year ending June 30, 1930.
Publications issued by health department.
Pamphlets covering all phases of public health.
Public health information disseminated through the weekly and daily papers of the State.
Florida health notes.
Annual reports.

GEORGIA

Board of health:
Robert F. Maddox, president, Atlanta.
James H. McDuffie, M. D., vice president, Columbus.
T. F. Abercrombie, M. D., secretary, Atlanta.
C. L. Ridley, M. D., Macon.
A. D. Little, M. D., Thomasville.
W. R. Neal, Savannah.
D. M. Carter, M. D., Madison.
J. G. Dean, M. D., Dawson.
John A. Rhodes, M. D., Crawfordville.
A. C. Shamblin, M. D., Rome.
C. R. Brice, D. D. S. Gainesville.
A. A. Lawry, D. D. S., Valdosta.
M. S. Brown, M. D., Fort Valley.
M. L. Duggan, State superintendent of schools, ex officio, Atlanta.
J. M. Sutton, State veterinarian, ex officio, Atlanta.
Executive health officer:
*T. F. Abercrombie, M. D., commissioner, Atlanta.
*Joe P. Bowdoin, M D., deputy commissioner, Atlanta.
Division of venereal-disease control:
*Joe P. Bowdoin, M. D., director, Atlanta.
Division of county health work:
*M. E. Winchester, M. D., director, Atlanta.
Division of laboratories:
* T. F. Sellers, director, Atlanta.
Division of sanitary engineering:
*L. M. Clarkson, director, Atlanta.
State tuberculosis sanatorium:
*M. F. Haygood, M. D., Superintendent, Alto.
Bureau of vital statistics:
*Butler Toombs.
Division of child hygiene:
*Joe P. Bowdoin, M. D., director, Atlanta.
Georgia training school for mental defectives:
*John W. Oden, M. D., superintendent.
Division of accounting and purchasing:
*C. L. Tinsley, director, Atlanta.
Appropriations for the fiscal year ending Dec. 31, 1929:

General appropriation	$150,000
Venereal-disease control	10,000
Maternity and infant hygiene	5,000

Appropriations for the fiscal year ending Dec. 31, 1929—Continued.

State tuberculosis sanatorium	$250,000
Georgia training school for mental defectives	72,270
Total appropriation by legislature	487,270
Central administration, county health work (International Health Board funds)	4,200
Central administration, malaria control (International Health Board funds)	3,500
Grand total	494,970

HAWAII

Board of health:
F. E. Trotter, M. D., president and executive officer, Honolulu.
Harry R. Hewitt, attorney general, Honolulu.
F. J. Pinkerton, M. D., Honolulu.
D. S. Bowman, Honolulu.
Mark A. Robinson, Honolulu.
J. Ordenstein, Honolulu.
J. Platt Cooke, Honolulu.
Executive health officer:
*F. E. Trotter, M. D., president of the board of health, Honolulu.
Assistant administrator:
*James T. Wayson, M. D., Honolulu.
Secretary:
*Mae R. Weir, Honolulu.
Bureau of sanitation:
*S. W. Tay, director, Honolulu.
*Robert L. Lam, sanitary engineer, Honolulu.
*A. K. Arnold, division supervisor, Oahu, Honolulu.
*J. Caceres, division supervisor, Island of Hawaii, Hilo.
*R. C. Lane, division supervisor, Island of Maui, Wailuku.
*A. P. Christian, division supervisor, Island of Kauai, Kapaa.
Health officer, Island of Hawaii:
*C. Charlock, Hilo.
Registrar general of vital statistics:
*M. H. Lemon, registrar general, Honolulu.
Bacteriologist:
*A. N. Sinclair, M. B., C. M., Honolulu.
Tuberculosis bureau:
*S. E. Doolittle, M. D., Honolulu.
Bureau of maternal and infant hygiene:
*Mabel L. Smyth, R. N., director, Honolulu.
Food commissioner and analyst:
*M. B. Bairos, Honolulu.
Territorial hospital:
*A. B. Eckerdt, M. D., superintendent, Kaneohe, Oahu.
Leprosarium:
*R. L. Cooke, superintendent, Kalaupapa, Molokai.
*L. F. Luckie, M. D., physician, Kalaupapa, Molokai.
*George B. Tuttle, M. D., assistant physician, Kalaupapa, Molokai.

Appropriations, 1929-1931:	
Board of health—General office—	
Salary, president	$14,400
Other personal services	68,380
Other current expenses	15,200
Repairs and alterations, Kalihi hospital, Kapiolani girls' home and Kalihi boys' home	16,000
Motor vehicles	1,500
Other equipment	750
Bureau of vital statistics—	
Personal services	30,690
Other current expenses	12,000
Equipment	400
Bureau of sanitation—	
Personal services	185,800
Other current expenses	25,000
Motor vehicles	5,000
Other equipment	665
Plague campaign—	
Personal services	39,450
Other current expenses	16,000
Motor vehicles	800
Other equipment	730
Quarantine service: General service—	
Personal services	23,720
Other current expenses	40,000
Motor vehicles	800
Other equipment	500
Quarantine service: Quarantine stations—	
Personal services	6,995
Other current expenses	8,000
Equipment	450
Bacteriological laboratories—	
Personal services	12,610
Other current expenses	3,000
Equipment	500
Agents (Government physicians)—	
Personal services	79,800
Pure food and drugs—	
Personal services	21,600
Other current expenses	3,750
Equipment	300
Tuberculosis: Government hospital (Puumaile home)—	
Personal services	41,450
Other current expenses	40,000
Equipment	2,000
Tuberculosis: Private hospitals—	
Contributions to Leahi home	168,000
Contributions to Kula sanitarium	96,000
Contributions to Samuel Mahelona Memorial Hospital	72,000
General medical assistants and nursing—	
Personal services	122,195
Other current expenses	35,500
Motor vehicles	6,500
Other equipment	1,700
Territorial hospital: Sanitarium—	
Personal services	18,240
Other current expenses	15,577
Equipment	1,017

Appropriations, 1929-1931—Continued.	
Territorial hospital—	
Personal services	$261,400
Other current expenses	199,100
Motor vehicles	1,500
Other equipment	78,500
Highways, trails, etc	7,500
Frame dormitories	25,000
Leper settlement and Kalihi hospital—	
Personal services	217,660
Other current expenses	442,000
Motor vehicles	3,700
Other equipment	8,000.00
Highways, trails, etc	10,000.00
Maternity ward, Kalaupapa	2,000.00
New cottage at Kalaupapa	3,000.00
Grants, subsidies, and contributions	21,200.00
It being provided that from this amount of $21,200 a cash allowance of $10 per annum shall be paid to each inmate of the Kalihi hospital and the Kalaupapa settlement, which shall be paid quarterly.	
Kapiolani girls' home—	
Personal services	15,330.00
Other current expenses	31,000.00
Equipment	1,550.00
Kalihi boys' home—	
Personal services	28,180.00
Other current expenses	31,000.00
Equipment	750.00
Boards of examiners—	
Personal services	250.00
Other current expenses	700.00
Maternal and infant hygiene—	
Personal services	36,903.84
It being provided, however, that the sum of $23,451.92 of the above appropriation of $36,903.84, or such amount thereof as remains unexpended, shall not be available for appropriation in the event that Federal funds are provided and made available as the same have been heretofore available.	
Aiding indigent persons released from the Kalihi hospital and leper settlement, Kalaupapa—	
Grants, subsidies, and contributions	3,500.00
Annual trips of children to visit parents, Kalaupapa—	
Other current expenses	800.00
Relief of persons released from Kalihi hospital and Kalaupapa—	
Grants, subsidies, and contributions	12,000.00
Total	2,697,522.84

Publications issued by health department:

Annual report of president.

Registrar general's report.

Monthly morbidity and mortality report.

IDAHO

Department of public welfare:
C. K. Macey, commissioner.
*W. V. Leonard, State chemist and sanitary engineer.
F. W. Almond, M. D., public health adviser.
*Lawrence J. Peterson, bacteriologist.
*Robert H. Pratt, dairy, food, drug, hotel, and sanitary inspector.
*Robert Quarles, dairy, food, drug, hotel, and sanitary inspector.
Executive health officer:
***C. K. Macey**, commissioner of public welfare, Boise.
Bureau of child hygiene:
*C. K. Macey, commissioner, ex officio State director, Boise.
Appropriations for biennial period ending Dec. 31, 1930:

Personal services	$49,000
Other expenses	16,500
Venereal-disease control	5,000
Child hygiene	5,000
Total	75,500

ILLINOIS

Board of public-health advisers:
Clifford U. Collins, M. D., chairman.
James H. Hutton, M. D., secretary.
R. J. Coultas, M. D., vice chairman.
Arnold H. Kegel, M. D.
W. A. Evans, M. D.
Director of public health:
***Andy Hall, M. D.**, Springfield.
Assistat director of public health:
*A. C. Baxter, M. D
Division of sanitation and engineer ng:
*Harry F Ferguson, C E., ch ef sanitary engineer.
Division of communicable diseases:
*J. J. McShane, M. D., D. P. H., chief.
Division of child hygiene and public-health nursing:
*Grace S. Wightman, M. D., chief.
Division of tuberculosis:
*A. C. Baxter, M. D., acting chief.
Division of laboratories:
*Lloyd Arnold, M. D., acting chief.
Division of vital statistics:
*Sheldon L. Howard, registrar.
Division of public-health instruction:
*Baxter K. Richardson, chief.
Division of social hygiene:
*C. C. Copelan, M. D., chiet.
Division of hotel and lodging house inspection:
*William F. Behrens, superintendent.
Appropriations for biennial period ending June 30, 1931:

Salaries	$808,140
Salaries State officers	30,400
Office expenses	22,500
Traveling expenses	130,850
Operation	193,834
Repairs and equipment	25,998
Contingent	30,000
Printing	52,000

Appropriations for biennial period ending June 30, 1931—Continued.

Postage	$20,000
Rabies	6,000
Total	1,319,722

Pub'ications issued by health department:
Illinois Health Quarterly.
Illinois Health Messenger (bimonthly).
Weekly press bulletin.
Educational health circulars.

INDIANA

Board of health:
A. J. Hostetler, M. D., president, Lagrange.
Calvin R. Marshall, M. D., vice president, Indianapolis.
John H. Green, M. D., North Vernon.
T. W. Oberlin, M. D., Hammond.
William F. King, M. D., secretary, Indianapolis.
Executive health officer:
***William F. King, M. D.**, State health commissioner, Indianapolis.
Division of vital statistics:
*H. M. Wright, director, Indianapolis.
Laboratory of hygiene:
*C. F. Adams, M. D., B. S. A., director, Indianapolis.
Division of food and drugs:
*I. L. Miller, State food and drug commissioner, Indianapolis.
Milk laboratory:
*Frank C. Wilson, director, Indianapolis.
Water and sewage laboratory:
*Lewis S. Finch, sanitary engineer, Indianapolis.
Division of child hygiene:
*Ada E. Schweitzer, M. D., director, Indianapolis.
Division of communicable diseases:
*H. W. McKane, M. D., director, Indianapolis.
Epidemiologist and assistant secretary:
*V. K. Harvey, M. D., Indianapolis.
Division of school hygiene:
*H. R. Condrey, director, Indianapolis.
Division of housing:
*A. E. Wert, director, Indianapolis.
Department of public-health nursing:
*Eva F. MacDougall, R. N., director, Indianapolis.
Appropriations for biennial period ending September 30, 1931, $256,500 per annum.

IOWA

State department of health:

EX OFFICIO

John Hammill, governor, Des Moines.
Ed. M. Smith, secretary of state, Des Moines.
R. E. Johnson, treasurer of state, Des Moines.
J. W. Long, auditor of state, Des Moines.
M. G. Thornburg, secretary of agriculture, Des Moines.
D. C. Steelsmith, M. D., State commissioner of health, Des Moines.

APPOINTIVE BY GOVERNOR

H. R. Sugg, M. D., president, Clinton.
C. T. Lesan, M. D., Mount Ayr.
H. W. Plummer, M. D., Lime Springs.
W. A. Seidler, M. D., Jamaica.
J. D. Lowry, M. D., Fort Dodge.

Executive health officer:
*D. C. Steelsmith, M. D., C. P. H., commissioner of health, Des Moines.

Chief clerk:
*Lynn Clemens, Des Moines.

Secretary:
*Naomi B. Wherry, Des Moines.

Division of preventable diseases:
*Howard A. Lanpher, M. D., C. P. H., director and epidemiologist, Des Moines.

Cooperative county health units:
*E. R. Coffey, M. D.

Division of vital statistics:
*R. L. McLaren, director, Des Moines.

Division of sanitary engineering:
*A. H. Wieters, C. E., director, Des Moines.

Division of public health nursing:
*Edith S. Countryman, R. N., director, Des Moines.

Division of nursing education:
*Maude E. Sutton, R. N., director, Des Moines.

Division of public health education:
*D. Pirie-Beyea, State lecturer, Des Moines.

Division of examinations and licensures:
*H. W. Grefe, director, Des Moines.

Division of law enforcement:
*Herman B. Carlson, LL. D., inspector, Des Moines.

Division of barber inspection:
*John T. McGruder, chief inspector, Des Moines.

Division of cosmetology inspection:
*Wanda Long, secretary, Des Moines.

Housing work is carried on by engineering division.

Medical, nurses, dental, optometry, cosmetology, chiropractic, osteopathy, embalming, podiatry, and barber examining boards are combined in State department of health.

Appropriations for fiscal year ending June 30, 1930:

For salaries and wages	$40, 200
Miscellaneous traveling	2, 500
Antitoxin, vaccine, and other prophylactics	5, 000
Sanitary engineering and housing—	
Salaries and wages	14, 000
Traveling	6, 000
Equipment and laboratory	1, 000
Quarantine enforcement and other contingencies	4, 000
Dues in national organizations	200
Investigation of tuberculosis	4, 000
Traveling epidemiologist	1, 800
Traveling lecturer	1, 500
Stream pollution	625
Replacing car	500
New car	400
Total	81, 725

Publications:
Biennial report.
Quarterly bulletin.
Health news-letter.

KANSAS

Board of health:
Clarence A. McGuire, M. D., president, Topeka.
H. L. Aldrich, M. D., vice president, Caney.
George I. Thacher, M. D., Waterville.
John H. Henson, M. D., Mound Valley.
Charles W. Robinson, M. D., Atchison.
Clay E. Coburn, M. D., Kansas City.
Arthur J. Anderson, M. D., Lawrence.
Anna Perkins, M. D., El Dorado.
Walter J. Eilerts, M. D., Wichita.
Thomas H. Finnigan, attorney, Kansas City.

Executive health officer:
*Earle G. Brown, M. D., secretary State board of health, Topeka.

Division of vital statistics:
*W. J. Davies, State registrar.

Division of communicable diseases:
*C. H. Kinnaman, M. D., epidemiologist, Topeka.

Division of foods and drugs:
*Thomas I. Dalton, Ph. C., assistant chief food and drug inspector, Topeka.

Division of child hygiene:
*J. C. Montgomery, M. D., chief, Topeka.

Division of rural sanitation:
*J. C. Montgomery, M. D., director, Topeka.

Division of water and sewage:
Earnest Boyce, chief, Lawrence.

Division of public-health education:
*Earle G. Brown, M. D., director, Topeka.

Division of venereal diseases:
*Earle G. Brown, M. D., director, Topeka.

Water and sewage laboratories at Kansas University:
Earnest Boyce, director, Lawrence.

Food laboratory at Kansas University:
Prof. E. H. S. Bailey, director of food analysis, Lawrence.

Drug laboratory at Kansas University:
Prof. L. D. Havenhill, director of drug analysis, Lawrence.

Food laboratory at Kansas Agricultural College:
Prof. H. H. King, director of food analysis, Manhattan.

Public-health laboratory, Topeka:
*Earle G. Brown, M. D., acting director, Topeka.

Appropriations for the fiscal year ending June 30, 1930:

	Salaries	Total
Executive	$5, 800	$8, 750
Division of communicable diseases	4, 500	10, 700
Division of food and drugs	10, 400	15, 400
Division of child hygiene	7, 300	10, 000
Division of cooperative county health work		7, 500
Public health laboratory, including appropriation for the purchase of arsphenamine for the treatment of indigent cases of syphilis	6, 340	10, 000
Division sanitation		3. 000
Board members		1, 250
Total	34, 340	66, 600

Other sources of revenue:
Marriage fees, approximately $20,000.
Water and ice analysis fees, approximately $14,000.
Publications issued by health department:
Biennial report.
Weekly morbidity report.

KENTUCKY

Board of health:
E. M. Howard, M. D., president, Harlan.
Geo. S. Coon, Louisville.
A.T. McCormack, M. D., secretary, Louisville.
J. Watts Stovall, Grayson.
Lawrence T. Minish, M. D., Frankfort.
B. B. Keys, M. D., Murray.
F. L. Johnson, M. D., Livermore.
C. J. Johnson, D. O., Louisville.
Addison Dimmitt, Louisville.
Executive health officer:
*A. T. McCormack, M. D., D. P. H., State health, officer, Louisville.
Bureau of county health work:
*P. E. Blackerby, M. D., director and assistant State health officer, Louisville.
*J. W. Davis, M. D., assistant, Winchester.
*V. A. Stilley, M. D., assistant, Benton.
Bureau of vital statistics:
*J. F. Blackerby, director, Louisville.
Bureau of bacteriology:
*Lillian H. South, M. D., director, Louisville.
Bureau of sanitary engineering:
*F. C. Dugan, C. E., director, Louisville.
Bureau of food, drugs, and hotels:
*Sarah Vance Dugan, director, Louisville.
Bureau of venereal diseases:
*Jethra Hancock, M. D., Louisville.
Bureau of public health nursing:
*Margaret East, R. N., director, Louisville.
Bureau of maternal and child health:
*Annie S. Veech, M. D., director, Louisville.
*Juanita Jennings, M. D., assistant.
Bureau of prevention of trachoma and blindness:
*C. B. Kobert, M. D., director, Louisville.
Bureau of budget:
*Elva Grant, director.
Bureau of epidemiology:
*J. L. Jones, M. D., director, Louisville.
Bureau of tuberculosis and State tuberculosis sanitarium:
*Paul A. Turner, M. D., director and superintendent, Louisville.
Bureau of dental health:
J. F. Owen, D. D. S., director, Lexington.
Legislative appropriation for fiscal year ending June 30, 1931, $315,000.
Publications issued by health department:
Monthly bulletin.

LOUISIANA

Board of health:
J. A. O'Hara, M. D., president, New Orleans.
T. J. Labbe, St. Martinville.
S. de Nux, D. D. S., Marksville.
J. L. Kelly, M. D., Oak Grove.
(Other members to be appointed.)
Fannie B. Nelken, secretary.
Executive health officer:
*J. A. O'Hara, M. D., president, New Orleans.
Bacteriologist:
W. H. Seemann, M. D., New Orleans.
Registrar vital statistics:
J. Geo. Dempsey, M. D., New Orleans.
Bureau of mental hygiene:
H. R. Unsworth, M. D., director, New Orleans.
Dairy and medical inspection:
E. J. DeBergue, M. D., New Orleans.
Bureau of public health administration:
*C. V. Akin, surgeon, U. S. P. H. S., director, New Orleans.
Mosquito-malaria control:
*W. T. Browne, Ph. D., M. D., director, New Orleans.
Sanitary engineer:
*John H. O'Neill, New Orleans.
Analyst:
*Cassius L. Clay, New Orleans.
Bureau of animal industry:
*G. T. Jackson, D. V. S., director, New Orleans.
Sanitary inspection:
Peter Rohrs, jr., chief, New Orleans.
Dairy and milk products:
H. N. Heffernan, technician, New Orleans.
Auditor:
Phil Arras, New Orleans.
Appropriations for fiscal year:
1930-31, $406,000.
1931-32, $406,000.
Publications issued by health department:
Quarterly bulletin.
Biennial report.
Miscellaneous leaflets.

MAINE

Public health council:
C. F. Kendall, M. D., chairman, Augusta.
H. A. Kelley, D. D. S., Portland.
Annie Peabody, Portland.
J. G. Towne, M. D., Waterville.
O. R. Emerson, M. D., Newport.
Mrs. Agnes B. Hall, Hampden.
Executive health officer:
*C. F. Kendall, M. D., State commissioner of health, Augusta.
Division of administration:
*C. F. Kendall, M. D., Augusta.
Division of communicable diseases:
*William L. Holt, M. D., director, Augusta.
Division of laboratories:
*Alfred G. Long, M. D., C. P. H., Augusta.
Division of sanitary engineering:
*Elmer W. Campbell, D. P. H., Augusta.
Division of vital statistics:
*C. F. Kendall, M. D., State registrar, Augusta.
Division of social hygiene:
*William L. Holt, M. D., director, Augusta.
Division of public health nursing and child hygiene:
*Edith L. Soule, R. N., Augusta.
Division of dental hygiene:
*Dorothy Bryant, D. H., Augusta.
District health officers:
*J. L. Pepper, M. D., South Portland.
*E. P. Goodrich, M. D., Winterport.
*R. L. Mitchell, M. D., Lewiston.

District health officers—Continued.
- *G. H. Hutchins, M. D., Waterville.
- *L. W. Hadley, M. D., Machias.
- *James W. Loughlin, M. D., Newcastle.
- *B. F. Porter, M. D., Caribou.

Appropriations for fiscal year ending June 30, 1930:

Salaries and clerk hire	$39,000
Office expense and epidemic fund	22,000
District and local health officers	40,000
Venereal-disease control work	14,000
Maternity and child-welfare work	25,000
Branch State laboratory, Caribou	2,500
Aid for typhoid carriers	5,000
Total	147,500

Other sources of revenue:
- Census Bureau, Washington, D. C., about $800.
- License fees from camps, roadside eating and lodging places, about $10,000.

MARYLAND

Board of health:
- Robert H. Riley, M. D., chairman, Baltimore.
- Thomas S. Cullen, M. D., Baltimore.
- Thomas H. Robinson, attorney general, Baltimore.
- William W. Ford, M. D., Baltimore.
- C. Hampson Jones, M. D., Baltimore.
- Tolley A. Biays, Baltimore.
- Benjamin C. Perry, M. D., Bethesda.
- E. F. Kelly, Phar. D., Baltimore.
- Burt B. Ide, D. D. S., Baltimore.

Executive health officer:
- *Robert H. Riley, M. D., Dr. P. H., director of health, Baltimore.

Division of personnel and accounts:
- *Walter N. Kirkman, chief, Baltimore.

Division of oral hygiene:
- *Richard C. Leonard, D. D. S., chief, Baltimore.

Division of legal administration:
- *J. Davis Donovan, chief, Baltimore.

Committee on public health education:
- *Gertrude B. Knipp, secretary, Baltimore.

Bureau of communicable diseases:
- *Robert H. Riley, M. D., Dr. P. H., chief, Baltimore.
- *C. H. Halliday, M. D., epidemiologist, Baltimore.
- *C. W. G. Rohrer, M. D., diagnostican, Baltimore.

Bureau of vital statistics:
- *John Collinson, M. D., Dr. P. H., chief, Baltimore.

Food and drug commissioner:
- *A. L. Sullivan, chief, Baltimore.

Bureau of bacteriology:
- *C. A. Perry, chief, Baltimore.

Bureau of sanitary engineering:
- *Abel Wolman, B. S. E., chief, Baltimore.

Bureau of chemistry:
- ——— ———.

Bureau of child hygiene:
- *J. H. Mason Knox, jr., M. D., chief, Baltimore.

Appropriations for fiscal year ending September 30, 1930:

Salaries	$280,317
Expenses	149,375
Emergency appropriation (epidemics, etc.)	10,000
Total	439,692

Publications issued by health department:
- Annual report.
- Weekly News Letter.
- Monthly bulletin.

MASSACHUSETTS

Public health council:
- George H. Bigelow, M. D., chairman, Boston.
- Roger I. Lee, M. D., Boston.
- Francis H. Lally, M. D., Milford.
- Richard P. Strong, M. D., Boston.
- Sylvester E. Ryan, M. D., Springfield.
- James L. Tighe, Holyoke.
- Gordon Hutchins, Concord.

Executive health officer:
- *George H. Bigelow, M. D., State Commissioner of public health, Boston.

Secretary:
- *Alice M. Ethier.

Division of administration:
- (Under direction of commissioner.)

Division of communicable diseases:
- *Clarence L. Scamman, M. D., director, Boston.

Division of sanitary engineering:
- *X. H. Goodnough, C. E., director and chief engineer, Boston.

Division of water and sewage laboratories:
- *H. W. Clark, director and chemist, Boston.

Division of biologic laboratories:
- *Benjamin White, Ph. D., director and pathologist, Boston.

Division of food and drugs:
- *Hermann C. Lythgoe, director and analyst, Boston.

Division of child hygiene:
- *M. Luise Diez, M. D., director, Boston.

Division of tuberculosis sanatoria:
- *Sumner H. Remick, M. D., director, Boston.

Division of adult hygiene:
- *Herbert L. Lombard, M. D., director, Boston.

Appropriations for department of public health, 1930:

Division of administration—	
Salary of commissioner	$7,500
Personal services	20,650
Services other than personal	15,500
Division of child hygiene—	
Personal services of director and assistants	40,000
Services other than personal	20,000
Personal services in connection with maternal and infant hygiene	21,200
Expenses in connection with maternal and infant hygiene	13,500

Appropriations for department of public health, 1930—Continued.

Division of communicable diseases—	
Personal services of director, district health officers, etc.	$71,000
Services other than personal	21,500
Personal services in connection with control of venereal diseases	12,200
Expenses in connection with control of venereal diseases	32,500
Wassermann Laboratory—	
For personal services	16,500
For expenses of laboratory	5,700
Antitoxin and vaccine laboratory—	
For personal services	67,700
Other services	42,375
Inspection of food and drugs—	
For personal services	50,500
Other services	15,250
For administering the shellfish law—	
Personal services	2,160
Other services	1,200
Water supply and disposal of sewage, engineering division—	
For personal services	72,000
For other services	21,000
Water supply and disposal of sewage, division of water and sewage laboratories—	
For personal services	42,000
For other services	8,000
Division of tuberculosis—	
For personal services	40,700
Services other than personal	10,660
For personal services of tuberculosis clinic units	48,400
Services other than personal (clinic units)	29,600
Payment of subsidies	263,000
For maintenance of and for certain improvements at the Lakeville, North Reading, Rutland, and Westfield State sanatoria	1,433,190
Division of adult hygiene—	
For personal services	39,700
For other expenses	37,000
Cancer hospital at Norfolk—	
For maintenance of and for certain improvements	266,200
For care of radium after purchase	10,000
Total	2,798,385

MICHIGAN

Advisory council of health:

——————— ———————.

Robert B. Harkness, M. D., Houghton.
Chalmers J. Lyons, D. D. Sc., Ann Arbor.
Leo J Dretzka, M. D., Detroit.
Louis J. Hirschman, M. D., Detroit.

Executive health officer:
*C. C. Slemons, M. D., State health commissioner, Lansing.

Bureau of engineering:
*E. D. Rich, C. E., director.
*John M. Hepler, assistant engineer.
*Willard F. Shephard, B. S. E. assistant engineer.

Bureau of engineering—Continued.
*Raymond J. Faust, assistant engineer.
*Herbert H. Hasson, assistant engineer.
*Orla E. McGuire, assistant engineer.
*F. B. Ransford, water inspector.

Bureau of laboratories:
*C. C. Young, Ph. D., Dr. P. H., director.
*Minna Crooks, R. N., bacteriologist.
*M. B. Kurtz, D. V. M. serologist.
*Pearl Kendrick, bacteriologist, West Michigan division.
*Ora Mills, bacteriologist, Houghton branch.
*A. B. Haw, clinical pathologist.
*Newton D. Larkum, Ph. D., immunologist.
*Roy W. Pryor, Dr. P. H., immunologist.
*Charles L. Bliss, toxicologist.
*Bruce Robinson, superintendent, biologic plant.

Bureau of child hygiene and public health nursing:
*Lillian R. Smith, M. D., director.
*Florence H. Knowlton, M. D., physician.
*Ida M. Alexander, M. D., prenatal consultant.
*Helen de Spelder Moore, R. N., assistant director.

Bureau of records and statistics:
*W. J. V. Deacon, M. D., director.

Bureau of education:
*Marjorie Delavan, director.
*Pearl Turner, assistant director.
*Melita Hutzel, lecturer.

Bureau of embalming:
*Frank J. Pienta, director.

Bureau of preventive medicine:
*Don M. Griswold, M. D., Dr. P. H., director.
*W. A. McIntosh, M. D., director, training station for health officers and public health nurses.
*W. J. Murphy, M. D., field epidemiologist.

Bureau of mouth hygiene:
*William R. Davis, D. D. S. director.

Bureau of industrial hygiene:
*Frank A. Poole, M. D., director.

Bureau of rural hygiene:
*W. H. Pickett, M. D., director.

Appropriations for fiscal year ending June 30, 1931:

Personal services	$300,000
Supplies; Contractual service	126,000
Outlay for equipment	9,900
Total	435,900
County health departments	20,000
Resort and roadside water inspection	16,000
Stream pollution	10,000
Buildings, biologic farm	7,500
Grand total	489,400

Publications issued by health department:
Monthly bulletin.
Annual report.
Communicable disease pamphlets.
Sex hygiene pamphlets.
Child hygiene pamphlets.
Engineering bulletins.
Mouth hygiene pamphlets.
Scientific reprint series.
Rules and regulations.
Health officers' manual.

MINNESOTA

Board of health:
L. P. Wolff, C. E., president, St. Paul.
J. A. Thabes, M. D., vice president, Brainerd.
S. Marx White, M. D., Minneapolis.
C. L. Scofield, M. D., Benson.
N. M. Watson, M. D., Red Lake Falls.
N. G. Mortensen, M. D., St. Paul.
O. F. Mellby, M. D., Thief River Falls.
W. H. Barr, M. D., Wells.
E. W. Fahey, M. D., St. Paul.
Executive health officer, Old Capitol, St. Paul:
***A. J. Chesley, M. D.**, secretary and executive officer.
Division of administration, Old Capitol, St. Paul:
*O. C. Pierson, director.
Division of vital statistics, Old Capitol, St. Paul:
*Gerda C. Pierson, director.
Division of hotel inspection, Old Capitol, St. Paul:
*A. W. Lindberg, State hotel inspector.
Division of preventable diseases (including venereal diseases), university campus, Minneapolis:
*O. McDaniel, M. D., director.
*Lucy Heathman, chief of laboratories.
*W. P. Greene, M. D., epidemiologist.
*James E. Perkins, M. D., epidemiologist.
*Ralph R. Sullivan, M. D., epidemiologist.
Division of sanitation, university campus, Minneapolis:
*H. A. Whittaker, director.
*O. E. Brownell, senior sanitary engineer.
Division of child hygiene, university campus, Minneapolis:
Everett C. Hartley, M. D., director.
*Olivia Peterson, superintendent of public-health nursing.
Appropriation for fiscal year ending June 30, 1931:

Maintenance and vital statistics—		
Salaries	$34,000	
Expenses	8,200	
		$42,200
Providing free antitoxin and other biological products		14,575
Venereal diseases		17,500
Sanitary engineering and laboratory		30,000
Preventable diseases and laboratory		61,500
Protection for maternity and infancy		33,000
Indian health work		10,000
Hotel inspection		37,000
Total		245,775

Publications issued by health department:
Educational pamphlets.

MISSISSIPPI

Board of health:
J. W. Lipscomb, M. D., president, Columbus.
Felix J. Underwood, M. D., secretary, Jackson.
S. E. Eason, M. D., New Albany.
L. B. Austin, M. D., Rosedale.
W. A. Dearman, M. D., Gulfport.
B. J. Shaw, M. D., Slate Springs.
W. H. Frizell, M. D., Brookhaven.
John Darrington, M. D., Yazoo City.
Dudley Stennis, M. D., Newton.
Wm. R. Wright, D. D. S., Jackson.

Executive health officer:
***Felix J. Underwood, M. D.**, executive officer, State board of health, Jackson.
Bureau of vital statistics:
*R. N. Whitfield, M. D., director, Jackson.
Bureau of child hygiene and public health nursing:
*Felix J. Underwood, M. D., acting director, Jackson.
*Mary D. Osborne, R. N., supervisor, public health nursing, Jackson.
*Gladys Eyrich, supervisor oral hygiene, Jackson.
Hygienic laboratory:
*T. W. Kemmerer, M. D., director, Jackson.
Bureau of sanitary engineering:
*H. A. Kroeze, C. E., director, Jackson.
*N. M. Parker, D. V. S., State sanitary inspector, Jackson.
*John M. Henderson, C. E., State sanitary inspector, Jackson.
*Floyd Ratliff, State sanitary inspector, Jackson.
Bureau of malaria control:
*Mark F. Boyd, M. D., C. P. H., director, Jackson.
Bureau of county health work:
*C. C. Applewhite, M. D., director, Jackson.
Bureau of communicable diseases:
*H. C. Ricks, M. D., C. P. H., director, Jackson.
State appropriation for period January 1, 1930, to December 31, 1930, $195,000.
Publications issued by health department:
Biennial report.
Weekly health letters published in all news papers of the State.
Health pamphlets.

MISSOURI

Board of health:
H. S. Gove, M. D., president, Linn.
Francis M. McCallum, M. D., vice president, Kansas City.
James Stewart, M. D., secretary, Jefferson City.
H. L. Kerr, M. D., Crane.
W. A. Clark, M. D., Jefferson City.
Ed Sanborn Smith, M. D., Kirksville.
Horace W. Carle, M. D., St. Joseph.
Executive health officer:
***James Stewart, M. D.**, State health commissioner, Jefferson City.
*Irl Brown Krause, M. D., assistant State health commissioner, Jefferson City.
Epidemiology:
*R. L. Russell, M. D., assistant epidemiologist.
Laboratories:
*R. L. Laybourn, bacteriologist.
Sanitary engineering:
*W. Scott Johnson, chief engineer.
Vital statistics:
*Ross Hopkins, M. D., statistician.
Child hygiene and cooperative county health work:
*Irl Brown Krause, M. D., director.
Public health nursing:
*Pearl McIver, R. N., director.

Appropriations for biennial period ending December 31, 1930:

Board of health—

Licensure	$40,000
Salaries	86,000
Contingent	42,000
Public health fund	159,500
Laboratories and prevention of blindness	50,000
Total	377,500

MONTANA

Board of health:
E. G. Balsam, M. D., president, Billings.
L. H. Fligman, M. D., vice president, Helena.
E. M. Porter, M. D., Great Falls.
George M. Jennings, M. D., Missoula.
B. L. Pampel, M. D., Livingston.
Executive health officer:
*W. F. Cogswell, M. D., secretary, Helena.
Division of communicable diseases:
*J. H. Crouch, M. D., epidemiologist, Helena.
Division of child welfare:
*Miss Alma Wretling, R. N., director, Helena.
Division of food and drugs:
*W. F. Cashmore, jr., director, Helena.
*Bert Kane, chemist, Helena.
Division of vital statistics:
*W. F. Cogswell, M. D., State registrar, Helena.
*L. L. Benepe, deputy State registrar, Helena.
Division of water and sewage:
*H. B. Foote, director, Helena.
W. M. Cobleigh, consultant, Bozeman.
*Jacob W. Forbes, analyst, Helena.
Hygienic laboratory:
*Fred D. Stimpert, director, Helena.
*Edith Kuhns, technician, Helena.
E. D. Hitchcock, M. D., consulting bacteriologist, Great Falls.
Appropriations for the years ending—

	June 30, 1930	June 30, 1931
Salaries	$31,000	$31,000
Operating expenses	17,300	17,300
Capital repairs and replacements	2,000	2,000
Division of child welfare	15,000	15,000
Board of entomology (Rocky Mountain spotted fever work)	25,000	25,000
Total	90,300	90,300
Other sources of revenue:		
Fees (about)		12,000
Rockefeller foundation		3,650

Publications issued by health department:
Special bulletins on communicable diseases.
Biennial report.

NEBRASKA

Department of public welfare:
Ernest M. Pollard, secretary, Lincoln.
Bureau of health—
Executive health officer—
*P. H. Bartholomew, M. D., director of public health, Lincoln.
Collaborating epidemiologist—
*P. H. Bartholomew, M. D., Lincoln.
Bacteriologist—
*L. O. Vose, Lincoln.
Division of venereal diseases—
*P. H. Bartholomew, M. D., director, Lincoln.
Statistician—
*Esther L. Stern, Lincoln.
Division of child hygiene—
*Bertha Riesland, chief clerk, Lincoln.
Medical examining board—
W. R. Boyer, M. D., Pawnee City.
H. J. Lehnhoff, M. D., Lincoln.
E. T. McGuire, M. D., Mead.
Appropriations for biennial period ending June 30, 1931—

Salaries	$40,000
Maintenance	22,000
Total	62,000

NEVADA

State board of health:
F. B. Balzar, governor, president, Carson City.
Edward E. Hamer, M. D., secretary and State health officer, Carson City.
W. G. Greathouse, secretary of State.
John Fuller, M. D., Reno.
A. J. Hood, M. D., Reno.
Executive health officer:
*Edward E. Hamer, M. D., Carson City.
State hygienic laboratory at State university:
*Vera E. Lautenschlager, acting director, Reno.
Appropriations for 1927 and 1928:

Salary of secretary	$5,000
For State board of health	5,100
For purchase of diphtheria antitoxin for free distribution	500
For bureau of vital statistics	500
Total	11,100

Publications issued by health department:
Biennial report.
Special bulletins.

NEW HAMPSHIRE

Board of health:
Robert Fletcher, O. E., president, Hanover.
O. E. Sullivan, M. D., Concord.
George O. Wilkins, M. D., Manchester.
Sibley G. Morrill, M. D., Concord.
Charles W. Tobey, governor.
Ralph W. Davis, attorney general, Manchester.

Executive health officer:
*Charles Duncan, M. D., secretary State board of health, Concord.
*Harriet I. Parkhurst, chief clerk, Concord.
Division of maternity, infancy, and child hygiene:
*Mary D. Davis, R. N., director and supervising nurse, Manchester.
Department of vital statistics:
*Charles Duncan, M. D., registrar, Concord.
*Bertha M. Watson, chief clerk, Concord.
Division of chemistry and sanitation:
*Charles D. Howard, chief of division, Concord.
*Harold Burrill, assistant chemist, Concord.
*Harriet I. Albee, assistant chemist and bacteriologist, Concord.
*Leonard W. Trager, assistant sanitary engineer, Concord.
*Joseph X. Duval, chief inspector, Concord.
Diagnostic and phathological department—
*William R. Macleod, serologist and diagnostic bacteriologist, Concord.
H. N. Kingsford, M. D., pathologist, Hanover.
*Benj. Jewell, assistant in pathological laboratory, Concord.
Venereal disease division:
*Charles A. Weaver, M. D., Manchester.
Appropriations for fiscal year ending June 30, 1930:

State board of health	$50, 150
Laboratory of hygiene	17, 300
Vital statistics	3, 750
Total	71, 200

Publications issued by health department:
Bulletin.
Biennial report.

NEW JERSEY

Board of health:
Charles I. Lafferty, president, Atlantic City.
Harold J. Harder, C. E., vice president, Paterson.
David D. Chandler, Newark.
H. E. Winter, V. M. D., Plainfield.
J. Oliver McDonald, M. D., Trenton.
S. A. Cosgrove, M. D., Jersey City.
Mrs. Helen M. Berry, Newark.
Margaret McNaughton, Jersey City.
J. E. H. Guthrie, D. D. S., Newark.
J. Lynn Mahaffey, M. D., Camden.
Frank S. Tainter, C. E., Far Hills.
Executive health officer:
*David C. Bowen, director of health, Trenton.
Bureau of Bacteriology:
*John V. Mulcahy, chief, Trenton.
Bureau of chemistry:
*John E. Bacon, chief, Trenton.
Bureau of administration:
*Charles J. Merrell, chief, Trenton.
Bureau of food and drugs:
*Walter W. Scofield, chief, Trenton.
Bureau of child hygiene:
Julius Levy, M. D., consultant, Trenton.
Bureau of local health administration:
*David C. Bowen, chief, Trenton.
Bureau of engineering:
*H. P. Croft, chief, Trenton.
Bureau of vital statistics:
*David S. South, chief, Trenton.
Bureau of venereal disease control:
A. J. Casselman, M. D., consultant, Trenton.
Appropriations for fiscal year ending 30, 1931:

Salaries	$203, 540. 00
Miscellaneous	67, 540. 00
Child hygiene	130, 298. 00
Venereal disease control	27, 612. 50
Total	428, 990. 50

Publications issued by health department:
Monthly bulletin.
Annual report.

NEW MEXICO

Board of public welfare:
Mrs. Francis C. Wilson, president, Santa Fe.
R. O. Brown, M. D., secretary, Santa Fe.
Mrs. A. M. Shortle, Albuquerque.
R. R. Ryan, Albuquerque.
H. A. Miller, M. D., Clovis.
Executive health officer:
*Paul S. Fox; M. S. in C. E., acting director of public health, Santa Fe.
Division of sanitary engineering and sanitation:
*Paul S. Fox, M. S. in C. E., chief, Santa Fe.
Division of public health nursing and child hygiene:
*Edith Hodgson, R. N., chief, Santa Fe.
Division of county health work:
———— ————
Public health laboratory:
*Myrtle Greenfield, M. S., chief, Albuquerque.
State registrar:
*Billy Tober, Santa Fe.
Appropriation for years 1930 and 1931, per annum, $38,400. Fiscal year ends June 30.

NEW YORK

Public health council:
Simon Flexner, M. D., LL. D., chairman, New York.
Homer Folks, LL. D., vice chairman, Yonkers.
Henry N. Ogden, C. E., Ithaca.
Frederick F. Russell, M. D., New York.
Jacob Goldberg, M. D., Buffalo.
Stanton P. Hull, M. D., Petersburg.
Thomas Parran, jr., M. D. (ex officio) commissioner of health, Albany.
Edward H. Marsh, M. D., Dr. P. H., secretary, Albany.
Executive health officer:
*Thomas Parran, jr., M. D., State commissioner of health, Albany.
Deputy commissioner of health:
*Paul B. Brooks, M. D., Albany.
Secretary:
*Edward H. Marsh, M. D., Dr. P. H., Albany.
Executive officer:
*Fenimore D. Beagle, Albany.
Division of public-health education:
*B. R. Rickards, director, Albany.
Division of sanitation:
*Charles A. Holmquist, C. E., director, Albany.

Division of vital statistics:
 *Joseph V. De Porte, Ph. D., director, Albany.
Division of child hygiene:
 *Elizabeth M. Gardiner, M. D., director, Albany.
Division of communicable diseases:
 *Edward S. Godfrey, jr., M. D., director, Albany.
Division of tuberculosis:
 *Robert Plunkett, M. D., director, Albany.
Division of social hygiene:
 *Albert Pfeiffer, M. D., director, Albany.
Division of laboratories and research:
 *Augustus B. Wadsworth, M. D., director, Albany.
Division of public-health nursing:
 *Mathilde S. Kuhlman, R. N., director, Albany.
Division of orthopedics:
 *Walter J. Craig, M. D., director, Albany.
Institute for the study of malignant disease, Buffalo:
 *Burton T. Simpson, M. D., director.
Appropriations for fiscal year ending June 30, 1931:

Personal service	$1,252,170.00
Maintenance and operation	536,290.00
Investigation of oyster beds (salaries included in personal service)	730.00
Physically handicapped children (salaries included in personal service)	12,400.00
State aid to county laboratories	110,000.00
State aid to county health activities	355,287.80
Investigation of milk and cream	90,000.00
Purchase of radium	300,000.00
Repairs	26,000.00
Total	2,682,877.80

Other sources of revenue:
 Fees from certified transcripts of birth, death, and marriage certificates, $1,913.11 per annum.
 Licensing laboratories, $461.
 Sale of serums, $1,037.59.
 Licensing of embalmers and undertakers, $17,578.
 Registration of embalmers and undertakers, $18,792.
Publications issued by health department:
 Weekly Health News.
 Monthly Vital Statistics Review.
 Annual report.

NORTH CAROLINA

Board of health:
 A. J. Crowell, M. D., Charlotte, president.
 Thomas E. Anderson, M. D., Statesville.
 E. J. Tucker, D. D. S., Roxboro.
 Cyrus Thompson, M. D., Jacksonville.
 D. A. Stanton, M. D., High Point.
 James P. Stowe, Ph. G., Charlotte.
 John B. Wright, M. D., Raleigh.
 L. E. McDaniel, M. D., Jackson.
 Charles C. Orr, M. D., Asheville.
Executive health officer:
 *William P. Jacocks, M. D.,[1] State health officer.
 *Ronald B. Wilson, assistant to the secretary, Raleigh.
Laboratory of hygiene:
 * C. A. Shore, M. D., director, Raleigh.
Deputy State registrar:
 *G. M. Cooper, M. D. (acting), Raleigh.
Bureau of engineering and inspection:
 *H. E. Miller, C. E., director, Raleigh.
Bureau of maternity and infancy:

———— ————

Bureau of health education:
 *G. M. Cooper, M. D., director, Raleigh.
Bureau of epidemiology:
 *H. A. Taylor, M. D., director, Raleigh.
Appropriations for fiscal year ending June 30, 1931:[2]

Administration	$29,745
Vital statistics	25,630
Laboratory of hygiene	68,000
School inspection	58,980
County health work	123,415
Epidemiology	10,490
Maternity and infancy	50,580
Engineering and inspection	75,720
Health education	11,410
Life extension	9,100
Printing	20,900
Orthopedic clinics	10,000
Cancer control	2,500
Total	496,470

Other sources of revenue:
 Special fees, $49,800.
Publications issued by health department:
 Monthly bulletin: The Health Bulletin.
 Special bulletins.
 Biennial report.

NORTH DAKOTA

Advisory health council:
 Bertha R. Palmer, superintendent of public instruction, ex officio, Bismarck.
 Fannie Dunn Quain, M. D., president North Dakota Tuberculosis Association, ex officio, Bismarck.
 Arne Oftedal, M. D., Fargo.
 Ella Clayton Smyth, Bismarck.
 R. S. Towne, D. D. S., Bismarck.
Executive health officer:
 *A. A. Whittemore, M. D., State health officer, Bismarck.
Child hygiene and public health nursing:
 *Maysil M. Williams, M. D., director, Bismarck.
Bureau of venereal diseases:
 *Robert W. Allen, M. D., Bismarck.
Bureau of sanitary engineering:
 *A. L. Bavone.
Bureau of vital statistics:
 *Viletta Roche, director.

[1] Doctor Jacocks probably will assume the duties of the office some time in December.
[2] Only 80 per cent of appropriations available for expenditure.

Appropriations for biennial period ending June 30, 1931:

For public health—

Salary	$7,200
Clerk hire	23,200
Postage	1,000
Supplies	1,500
Furniture and fixtures	1,000
Printing	3,000
Miscellaneous	1,000
Travel	1,500
Card indexing	2,500

For division of child hygiene and public health nursing—

Salary	6,000
Clerk hire	9,600
Postage	3,000
Supplies	200
Furniture and fixtures	100
Printing	4,000
Miscellaneous	100
Travel	3,000

OHIO

Public health council:
- Chas. A. Neal, M. D., chairman, Columbus.
- James E. Bauman, secretary.
- G. D. Lummis, M. D.
- C. O. Probst, M. D.
- R. M. Calfee.
- W. I. Jones, D. D. S.

Executive health officer:
- *Chas. A. Neal, M. D., director of health, Columbus.

Assistant director of health:
- *James E. Bauman.

Division of administration:
- *James E. Bauman, chief.
- *C. A. Orrison, chief clerk.
- Bureau of publicity—
  - *Paul Mason, director.
- Bureau of local health organization—
  - *E. R. Shaffer, M. D., chief.

Division of communicable diseases:
- *Finley Van Orsdall, M. D., chief.
- *T. W. Mahoney, M. D., chief epidemiologist.
  - Bureau of venereal diseases—
  - ——— ———
  - Bureau of prevention of blindness—
  - ——— ———

Division of sanitary engineering:
- *F. H. Waring, chief.
- Bureau of plumbing inspection—
  - *A. A. Manchester, chief.

Division of vital statistics:
- *Irva C. Plummer, chief.

Division of laboratories:
- *Leo F. Ey, chief.

Division of hygiene:
- *H. M. Austin, M. D., chief.
- Bureau of tuberculosis—
  - *W. D. Tillson, M. D.
- Bureau of hospitals—
  - *Pearl G. Thompson, chief.
- Bureau of dental hygiene—
  - *L. G. Bean, D. D. S., chief.

Division of child hygiene:
- *A. B. Lippert, M. D., chief.
- Bureau of public health education—
  - ——— ———

Division of public health nursing:
- *Zoe McCaleb, R. N., chief.

Division of industrial hygiene:
- *B. E. Neiswander, M. D., chief.
- E. R. Hayhurst, M. D., consultant.

Appropriations for 12 months ending December 31, 1929:

Personal services	$230,000
Maintenance	158,073
State aid for health districts	250,000
Total	638,073

Publications issued by health department:
- Ohio Health News (semimonthly).

OKLAHOMA

Executive health officer:
- *Clyde W. Besson, M. D., State health commissioner, Oklahoma City.

Assistant State health commissioner:
- *J. P. Folan, Oklahoma City.

Bureau of vital statistics:
- *N. H. Moore.

Bureau of laboratories:
- *D. T. Bowden, M. D., director of laboratory.

Bureau of maternity and infancy:
- *Mable Sherin, director.

Bureau of venereal disease control:
- C. L. Brundage, M. D., director.

Bureau of rural sanitation:
- *D. T. Bowden, M. D., director.

Bureau of sanitary engineering:
- *H. J. Darcey, director.

Bureau of public health education:
- *G. Harrison, director.

Bureau of dental health education:
- *Pearl E. Wilson, R. N.

Bureau of epidemiology:
- *G. F. Mathews, M. D.

Appropriations for fiscal year ending June 30, 1931:

Administration—	
Commissioner	$4,800
Assistant commissioner	2,400
Secretary and stenographer	1,800
Bookkeeper	2,000
Stenographers (1 at $1,800, 1 at $1,500, and 1 at $1,200)	4,500
Bureau of public health education—	
Director	2,400
Stenographer	1,500
Bureau of diagnostic laboratory—	
Chemist	3,000
Assistant chemist	2,400
Bacteriologist	3,000
Assistant bacteriologist	2,400
Record clerk	1,800
Extra help—janitor	1,200
Manufacture vaccine	2,500
Bureau of sanitary engineering—	
Engineer	3,000

Appropriations for fiscal year ending June 30, 1931—Continued.

Bureau of pure food, drugs, and sanitary inspection—	
Supervisor (sanitary engineer)	$2,400
Inspectors (6 at $1,800 each)	10,800
Bureau of vital statistics—	
Registrar	2,400
Assistant registrar	1,800
Statistical clerks (3 at $1,500 each)	4,500
Bureau of maternity and infancy—	
Director	3,000
Stenographer	1,500
Head nurse	2,400
Field nurses (4 at $1,800 each)	7,200
Printing, office supplies, and communications	7,000
Traveling expenses, including motor supplies and motor repairs	5,000
Travel, all departments	17,500
Communication	3,000
Printing	3,500
Other expenses	2,100
Office supplies	1,200
Medical supplies	7,000
Office equipment	750
Laboratory equipment	900
Special appropriations unallocated:	
Control of venereal diseases	10,800
Epidemiology, disease prevention	5,000
Rural sanitation and disease control in the rural districts and county health units	35,000
Malaria control	10,000
Total	183,450

OREGON

Board of health:

W. B. Morse, M. D., president, Salem.

J. H. Rosenberg, M. D., vice president, Prineville.

Frederick D. Stricker, M. D., secretary and State health officer, Portland.

George E. Houck, M. D., Roseburg.

W. T. Phy, M. D., Hot Lake.

N. E. Irvine, M. D., Lebanon.

H. H. Foskett, M. D., Portland.

Executive health officer:

*Frederick D. Stricker, M. D., secretary and State health officer, Portland.

Registrar of vital statistics:

*Frederick D. Stricker, M. D., Portland.

Division of child hygiene and public health nursing:

*Glendora Blakely, R. N., Portland.

Director of laboratory:

*William Levin, D. P. H., Portland.

Appropriations for fiscal year ending December 31, 1929, $45,212.

Publications issued by health department:

Annual report.

Biennial report.

Pamphlets and posters.

Weekly letter.

PENNSYLVANIA

Department of health:

Advisory board—

Theodore B. Appel, M. D., chairman.

H. C. Frontz, M. D., Huntingdon.

J. M. Wainwright, M. D., Scranton.

A. A. Cairns, M. D., Philadelphia.

S. R. Haythorn, M. D., Pittsburgh.

C. B. Auel, M. E., East Pittsburgh.

Charles F. Mebus, C. E., Glenside.

Sanitary water board—

Theodore B. Appel, M. D., chairman.

Charles E. Dorworth, secretary of forests and waters, Bellefonte.

Nathan R. Buller, commissioner of fisheries, Pleasant Mount.

P. T. Davis, Clearfield.

Dean Elmer A. Holbrook, Pittsburgh.

J. Norman Henry, M. D., Philadelphia.

W. L. Stevenson, chief engineer and secretary, Harrisburg.

Executive health officers—

*Theodore B. Appel, M. D., secretary of health, Harrisburg.

*J. Bruce McCreary, M. D., deputy secretary of health, Shippensburg.

Sanatoria:

Mont Alto sanatorium—

*R. H. McCutcheon, M. D., medical director, South Mountain.

Cresson sanatorium—

*T. H. A. Stites, M. D., medical director, Cresson.

Hamburg sanatorium—

*Henry A. Gorman, M. D., medical director, Hamburg.

Hospital for crippled children, Elizabethtown—

*Francis S. Chambers, M. D., medical director.

Bureau of communicable diseases—

*J. Moore Campbell, M. D., Harrisburg.

Section of epidemology—

*Harold B. Wood, M. D.

*F. E. Coughlin, M. D.

Section of tuberculosis—

*John B. Critchfield, M. D., Lock Haven.

Genito-urinary section—

*Edgar S. Everhart, M. D., Lemoyne.

Section of restaurant hygiene—

*Howard M. Haines, Harrsibyrg.

Bureau of sanitary engineering—

*W. L. Stevenson, C. E., chief engineer, Harrisburg.

Section of waterworks and sewerage—

*H. E. Moses, Harrisburg.

Section of roadside water supplies—

*Henry P. Drake.

Section of housing—

*H. F. Bronson, C. E., Harrisburg.

Section of nuisances—

*D. V. Ness.

Section industrial waste—

*F. E. Daniels, Harrisburg.

Sanatoria—Continued.

Bureau of milk control—

*Ralph E. Irwin, Camp Hill.

Child health—school control—

Field supervision—

*C. W. Sheldon, M. D.

School sanitation—

*John G. Ziegler, Lebanon.

Preschool section—

*Mary Riggs Noble, M. D., Harrisburg

Dental hygiene—

*C. J. Hollister, D. D. S., Harrisburg.

Bureau of finance—

*Clinton T. Williams, Harrisburg

Section of accounts—

*E. J. MacNamara.

Section of supplies—

*Roy G. Miller, Harrisburg.

Bureau of vital statistics—

*Emlyn Jones, M. D., Johnstown.

Bureau of laboratories—

*John L. Laird, M. D., Philadelphia.

Bureau of drug control—

*James N. Lightner, LL. B., Lancaster.

Bureau of nursing—

*Alice M. O'Halloran, R. N., Harrisburg.

Bureau of inspection—

*James Duffy, Marietta.

Bureau of public health education—

*J. C. Funk, LL. B., Harrisburg.

Appropriations for biennial period ending May 31, 1931:

General health purposes and maintenance of sanatoria	$5,266,500
Furnishings and equipment for hospital for crippled children	253,000
Sanitary water board	186,000
Construction for Mont Alto, Cresson, and Hamburg sanatoria	975,000
Total	6,662,500

PHILIPPINE ISLANDS[1]

Director of health:

Jacobo Fajardo, M. D., Manila.

Council of hygiene, advisory board to the director of health:

Fernando Calderon, M. D., president, Manila.

Regino G. Padua, M. D., secretary, Manila.

José Fabella, M. D., Manila.

Gervasio Ocampo, M. D., Manila.

José, Albert, M. D., Manila.

Benito Valdes, M. D., Manila.

Eulogio P. Revilla, LL. B., Manila.

Vicente Genato, Manila.

Executive officer:

*Jacobo Fajardo, M. D., director of health, Manila.

Assistant to the director:

*Regino G. Padua, M. D., Manila.

Office of records and finance:

*Mamerto Tianco, chief, Manila.

Office of property:

*Bonifacio Mencias, M. D., acting chief, Manila.

Office of vital statistics:

José Guidote, M. D., chief, Manila.

Office of general inspection:

*Rafael Villafranca, M. D., chief, Manila.

Public health education and publicity:

*José P. Bantug, M. D., chief, Manila

Public health nursing:

*Rosario Pastor, M. D., chief, Manila.

Division of communicable diseases:

*Leoncio Lopez Rizal, M. D., chief, Manila.

Division of metropolitan sanitation:

*Eugenio Hernando, M. D., chief, Manila.

Division of hospitals, dispensaries, and laboratories:

*Eusebio D. Aguilar, M. D., chief, Manila.

Leprosy section—

*Vicente Kierulf, M. D., chief.

Culion Leper Colony:

*Sulpicio Chiyuto, M. D., chief, Manila.

Division of provincial sanitation:

*Gabriel Intengan, M. D., chief, Manila.

Division of malaria control:

*Cristobal Manalang, M. D., chief.

*Antonio Ejercito, M. D., assistant chief.

Division of sanitary engineering:

*Manuel Mañosa, C. E., chief, Manila.

Appropriations for fiscal year ending December 31, 1929:

Salaries and wages	$501,493
Miscellaneous expenses	985,887
Furniture and equipment	11,250
Total	1,498,630
Special expenses—	
Continuation of treatment and diagnosis of lepers	125,000
Maintenance of regional treatment stations, etc	62,500
Aid to specially organized Provinces	270,550
Aid to the Province of Ilocos Sur for the operation, maintenance, and equipment of the Cervantes hospital	10,000
School of nursing in Baguio	5,250
Medicines, medical and surgical supplies for distribution to public-school dispensaries	5,000
General demonstration on a small scale of the practical control of beriberi	5,000
Contribution to the University of the Philippines for the operation of the School of Sanitation and Public Health	20,000
Control of malaria in the regularly and specially organized Provinces and municipalities and municipal districts	37,000
Total for special expenses	540,300
Grand total of appropriations	2,038,930

[1] Data supplied in 1929.

Publications issued by the Philippine health service:
Daily Service News.
Weekly comparative epidemological résumé.
Weekly résumé of births and deaths.
Monthly bulletin.
Annual report.
Occasional pamphlets.

PORTO RICO

Department of health:
*Pedro N. Ortiz, M. D., commissioner of health, San Juan.
*A. Fernós Isern, M. D., assistant commissioner, San Juan.
Insular board of health:
A. Fernós Isern, M. D., chairman, San Juan.
Donald C. Cook, San Juan.
W. A. Glines, M. D., San Juan.
Pablo Morales Otero, M.D., San Juan.
G. A. Ramirez de Arellano, San Juan.
R. López Sicardó, M. D., San Juan.
A. Ortiz Toro, San Juan.
Luis B. de la Vega, M. D., secretary, San Juan.
Division of property and accounts:
*Abelardo Santiago, chief, San Juan.
Division of sanitary engineering:
*Octavio Marcano, sanitary engineer, San Juan.
Bacteriological laboratory:
*Oscar Costa Mandry, M. D., director, San Juan.
Chemical laboratory:
*R. del Valle Sárraga, chemist, director, San Juan.
Division of transmissible diseases:
*M. O. de la Rosa, M. D., chief, San Juan.
*E. Garrido Morales, M. D., epidemiologist, San Juan.
Bureau of statistics:
*Manuel A. Pérez, chief, San Juan.
Appropriations for the fiscal year ending June 30, 1931:

Office of the commissioner of health	$281,914.02
Leper hospital	34,166.50
Quarantine hospital	12,700.00
Antituberculosis sanatorium of Porto Rico	139,070.50
Blind asylum	41,060.00
Institute for blind children	27,270.00
Insular insane asylum	194,570.00
Education and maintenance of poor deaf and dumb children	4,000.00
Care of tuberculosis patients in the sanatorium at Ponce under the control of the department of health	15,000.00
Control and prevention of venereal diseases	12,000.00
Care of 60 tuberculous patients of the municipality of San Juan at the antituberculosis sanatorium	12,500.00
Maintenance of the antituberculosis hospital of Caguas, under the direction of the department of health	6,000.00

Appropriations for the fiscal year ending June 30, 1931—Continued.

Control and suppression of tuberculosis	$60,000.00
Prevention of infantile mortality	27,000.00
Mosquito extermination and control and suppression of malaria	50,000.00
Suppression of anemia	100,000.00
Rat extermination	5,000.00
Ponce district hospital	30,360.00
Division of school hygiene	7,000.00
Girls' charity school	82,678.00
Boys' charity school	108,572.00
Sanitation fund	162,507.56
Total	1,413,368.58

RHODE ISLAND

Public health commission:
Thomas J. McLaughlin, M. D., chairman, Woonsocket.
James H. Prior, M. D., Providence.
Berton W. Storrs, M. D., Portsmouth.
John Champlin, jr., M. D., Westerly.
Charles H. Holt, M. D., Pawtucket.
Executive health officer:
Lester A. Round, Ph. D., director of public health and State registrar, State Office Building, Providence.
Pathologist:
Lester A. Round, Ph. D., Providence.
Chemist:
Charles L. Poole, Providence.
Appropriations for fiscal year ending November 30, 1929:

Executive department	$51,505
Chemical laboratory	21,950
Pathological laboratory	23,863
Child welfare	23,720
Venereal diseases	8,460
Total	129,498

SOUTH CAROLINA

Executive committee, board of health:
Robert Wilson, jr., M. D., chairman, Charleston.
L. D. Boone, M. D., Aiken.
Davis Furman, M. D., Greenville.
E. A. Hines, M. D., Seneca.
W. R. Wallace, M. D., Chester.
William Egleston, M. D., Hartsville.
J. Lee Carpenter, Ph. G., Greenville.
F. M. Routh, M. D., Columbia.
George Dick, D. D. S., Sumter.
John M. Daniel, attorney general, Columbia.
A. J. Beattie, comptroller general, Columbia.
Executive health officer:
*James A. Hayne, M. D., State health officer, Columbia.
Department of county health units:
*Ben F. Wyman, M. D., director, Columbia.
Bureau of child hygiene:
*Nellie Cunningham, R. N., supervisor of public health nursing, Columbia.
Laboratory department:
*H. M. Smith, M. D., in charge, Columbia.
*J. R. Cain, chief bacteriologist, Columbia.

Bureau of vital statistics:
*C. W. Miller, chief clerk, Columbia.
Bacteriologist and chemist:
F. L. Parker, jr., M. D., Ph. D., Charleston.
South Carolina Sanitorium:
*Ernest Cooper, M. D., superintendent, Columbia.
Epidemiologist:
*A. H. Hayden, M. D., Columbia.
Sanitary engineer:
*A. E. Legare, C. E., Columbia.
Appropriations for fiscal year ending December 31, 1930:

Administrative office	$12, 260. 00
Control of epidemic diseases	54, 220. 00
Bureau of child hygiene	9, 970. 00
Bureau of vital statistics	8, 305. 00
Laboratory	12, 530. 00
Bureau of rural sanitation	49, 787. 50
Division of sanitary engineering	13, 390. 00
Tuberculosis sanatoria	161, 681. 91
Aid for crippled children	12, 400. 00
Total	334, 544. 41

Publications issued by health department:
Annual report.
Bulletins of various departments.

SOUTH DAKOTA

Board of health:
H. J. Bartron, M. D., president, Watertown.
N. T. Owen, M. D., vice president, Rapid City.
A. C. Clark, M. D., Woonsocket.
H. R. Kenaston, M. D., Bonesteel
P. B. Jenkins, M. D., superintendent, Waubay.
Executive health officer:
*Park B. Jenkins, M. D., Waubay.
Division of vital statistics:
*Park B. Jenkins, M. D., Waubay
Division of records and accounts:
*Edna Jenkins.
Division of medical licensure
H. R. Kenaston, M. D.
Laboratories (at Vermilion):
J. C. Ohlmacher, M. D.
Division of child hygiene:
*Florence E. Walker, R. N.
Division of epidemiology:
*A. E. Bostrom, M. D.
Division of sanitary engineering:
*W. W. Towne, B. E.

Appropriations:

	1929-30	1930-31
Salaries and wages	$21, 500	$21, 500
Supplies and materials	2, 500	2, 500
Communication and travel	4, 000	4, 000
Printing, binding, and advertising	2, 000	2, 000
Light and power	250	250
Rents	1, 560	1, 560
Crippled children	2, 500	2, 500
Dues	50	50
Maternity and infancy work	5, 000	5, 000
Total	39, 360	39, 360

TENNESSEE

Department of public health:
Central administration—
*E. L. Bishop, M. D., C. P. H., commissioner, Nashville.
*H. S. Mustard, M. D., assistant commissioner, Nashville.
Section of local organization—
*W. K. Sharp, jr., M. D., director Nashville.
Section of child hygiene and public health nursing—
*H. S. Mustard, M. D., director, Nashville.
Miss M. G. Nisbet, supervising nurse, Nashville.
Section of health education—
*H. S. Mustard, M. D., director, Nashville.
Division of vital statistics—
*J. B. Bond, M. D., director, Nashville.
Division of preventable diseases—
*J. A. Crabtree, M. D., C. P. H., director, Nashville.
Section of epidemiology—
*H. C. Stewart, M. D., C. P. H., director, Nashville.
Tuberculosis control section—
*R. S. Gass, M. D., director, Nashville.
Division of laboratories—
*William Litterer, M. D., director, Nashville.
Division of sanitary engineering—
*Roy J. Morton, C. E., director, Nashville.
Appropriation for the fiscal period July 1, 1929, to June 30, 1931—

General administration	$40, 200
Vital statistics	37, 600
Sanitary engineering	51, 300
Laboratories	67, 840
Health education	14, 400
Epidemiology	59, 000
Local organization	285, 600
Child hygiene and public health nursing	120, 200
Tuberculosis control	90, 000
Total	766, 140

Other sources of revenue—
United States Department of Labor, maternity and child welfare, $25,767.55 per annum. (Cooperation with Department of Labor ended June 30, 1929.)
International Health Board $24,400 (variable) per annum.
International Health Board, cooperation in malaria control, epidemiology, and local organization, vital statistics. United States Public Health Service in malaria control. Individual counties and cities in State cooperation in malaria control, county health work, and child hygiene and public health nursing. United States Public Health Service cooperation in county health work, $18,000 per annum.

TEXAS

Board of health:
- J. M. Frazier, M. D., Belton.
- J. S. Wooten, M. D., Austin.
- A. A. Ross, M. D., Lockhart.
- C. M. Rosser, M. D., Dallas.
- E. W. Wright, M. D., Bowie.
- Joe Gilbert, M. D., vice chairman, Austin.
- J. C. Anderson, M. D., ex officio, president of the board and State health officer, Austin.

Executive health officer:
- ***J. C. Anderson, M. D.**, State health officer, Austin.

Bureau of child hygiene:
- *H. N. Barnett, M. D., director.

Bureau of vital statistics:
- *W. A. Davis, M. D., director.

Bureau of communicable diseases and hygienic laboratory:
- S. W. Bohls, M. D., director.

Bureau of sanitary engineering:
- *V. M. Ehlers, C. E., director.

Bureau of foods and drugs:
- *E. G. Le May, Ph. G., director.

Appropriations for fiscal years 1929–1931, $209,520 per annum.

UTAH

Board of health:
- Joseph R. Morrell, M. D., president, Ogden.
- T. B. Beatty, M. D., secretary, Salt Lake City.
- Joseph H. Peck, M. D., Tooele.
- John M. Wallace, Salt Lake City.
- W. D. Donoher, M. D., Salt Lake City.
- R. A. Hart, C. E., Salt Lake City.
- Barnet E. Bonar, M. D., Salt Lake City.

Executive health officer:
- ***T. B. Beatty, M. D.**, State health commissioner, Salt Lake City.

Bureau of vital statistics:
- *T. B. Beatty, M. D., State registrar.
- *Anna M. Bowen, deputy registrar.

Bureau of child hygiene:
- *T. B. Beatty, director.

Epidemiologist:
- *A. C. McKean, M. D.

Sanitary engineer:
- *Leonard H. Male.

Bacteriological laboratory:
- *E. H. Bramhall, bacteriologist.

Appropriations for two years ending June 30, 1931:

Salaries	$42,456
Office expenses	8,000
Travel	3,300
Equipment	500
Child hygiene (to match Federal funds)	13,000
Total	67,256

Publications issued by health department:
- Quarterly bulletin.
- Biennial report.

VERMONT

Board of health:
- Edward J. Rogers, M. D., chairman, Pittsford.
- William G. Ricker, M. D., St. Johnsbury.
- John P. Gifford, M. D., Randolph.

Executive health officer:
- ***Charles F. Dalton, M. D.**, secretary, State board of health, Burlington.

Laboratory of hygiene:
- *Charles F. Whitney, M. D., director, Burlington.

Sanitary engineering:
- J. W. Votey, C. E., Burlington.

Sanitary inspector:
- *Fred S. Kent, M. D., Burlington.

Division of communicable diseases:
- *Fred S. Kent, M. D., Burlington.

Division of tuberculosis:
- *H. W. Slocum, Burlington.

Division of poliomyelitis:
- *W. L. Aycock, M. D., research, Burlington
- *Lillian E. Kron, R. N., Burlington.

Division of maternal and infant hygiene:
- *Nellie M. Jones, R. N., maternity, infancy, and child hygiene nurse.

Appropriations for fiscal year ending June 30, 1930:
- Total budget, $45,000.

Other sources of revenue:
- Private donations for study and treatment of infantile paralysis.

Publications issued by health department:
- Biennial report.

VIRGINIA

Board of health:
- W. T. Graham, M. D., president, Richmond.
- Mrs. W. M. Smith, Purcellville.
- Frank Darling, Hampton.
- J. A. McGuire, M. D., Norton.
- Guy R. Harrison, D. D. S., Richmond.
- George B. Lawson, M. D., Roanoke.
- L. T. Royster, M. D., University.

Executive health officer:
- ***Ennion G. Williams, M. D.**, State health commissioner, Richmond.

Assistant health commissioner and director of rural health work:
- *Roy K. Flannagan, M. D., Richmond.
- *C. R. Keiley, associate director of rural health work.

Registrar of vital statistics:
- *W. A. Plecker, M. D., Richmond.

Bacteriologist:
- *G. F. McGinnis, M. D., Richmond.

Sanitary engineer:
- Richard Messer, C. E., Richmond.

Bureau of child welfare:

———————

Director public health nursing:
- *Nannie J. Minor, R. N., Richmond.

Director mouth hygiene:
- *N. Talley Ballou, D. D. S., Richmond.

Director tuberculosis out-patient service:
- *Agnes D. Randolph, R. N., Richmond.

Epidemiologist:
- *H. G. Grant, M. D.

Appropriations for the fiscal year ending June 30, 1931:

Administration	$22,580
Sanitary engineering	22,085
Publicity	13,450
Town sanitation	4,500
Social hygiene	2,500

Appropriations for the fiscal year ending June 30, 1930—Continued.

Prevention of tuberculosis	$65,900
Control of epidemics	10,975
Laboratories	24,340
Promotion of child health	57,380
Rural health work	95,000
Shellfish inspection and sanitation	25,000
Orthopedic treatment	25,000
Vital statistics	27,570
Collection and publication of marriage and divorce statistics	4,005
Prevention of blindness	2,360
Total	402,645

Publications issued by health department:
- Monthly bulletin.
- Annual report.

WASHINGTON

Board of health:
- A. E. Stuht, M. D., director of health, chairman.
- Clarence A. Smith, M. D., Seattle.
- James H. Egan, M. D., Tacoma.
- Samuel L. Caldbick, M. D., Everett.
- John O'Shea, M. D., Spokane.
- H. W. Nightingale, secretary, Seattle.

Executive health officer:
- *A. E. Stuht, M. D., State director of health, Seattle.

Epidemiologist:
- *A. U. Simpson, M. D., Seattle.

Chief of laboratory:
- *A. U. Simpson, M. D., Seattle.

Sanitary engineer:
- *H. W. Nightingale, C. E., Seattle.

Registrar:
- *H. W. Nightingale, C. E., Seattle.

Division of public health nursing:
- *Mary Louise Allen, chief.

Appropriation for two years ending March 31, 1931.

Operations	$100,000
Tuberculosis hospitals—	
State aid to local sanatoria	125,000
Additional for King County hospital	30,000

WEST VIRGINIA

Public health council:
- B. O. Robinson, M. D., president, Parkersburg.
- H. A. Barbee, M. D., Point Pleasant.
- W. S. Fulton, M. D., Wheeling.
- W. E. Neal, M. D., Huntington.
- A. H. Hoge, M. D., Bluefield.
- R. H. Walker, M. D., Charleston.
- W. T. Henshaw, M. D., commissioner of health, Charleston.

Executive health officer:
- *W. T. Henshaw, M. D., commissioner of health, Charleston.

Division of sanitary engineering:
- *Ellis S. Tisdale, chief engineer, Charleston.
- *John B. Harrington, assistant engineer, Charleston.
- *H. K. Gidley, assistant engineer, Charleston.

Division of vital statistics:
- *Carl F. Raver, M. D., M. P. H., Charleston.

Division of child hygiene:
- *R. H. Paden, M. D., director, Charleston.
- *Edna M. Hardsaw, R. N., field advisory nurse, Charleston.
- *Mildred McClelland, R. N., field advisory nurse, Charleston.

Division of preventable diseases:
- *W. T. Henshaw, M. D., acting director, Charleston.

Bureau of venereal diseases:
- *David Littlejohn, M. D., A. A., surgeon, U. S. P. H. S., director, Charleston.
- *Ada Coddington McDermott, associate director, Charleston.

Division of rural sanitation:
- *David Littlejohn, A. A. surgeon, U. S. P. H. S., director, Charleston.

Hygienic laboratory:
- *Elizabeth I. Parsons, director, Charleston.
- *Margaret K. Rifle, laboratory technician, Charleston.
- *J. Roy Monroe, technician, Charleston.
- *J. C. Harp, technician, Charleston.

Bureau of public health education:
- *Dorothea Campbell, director, Charleston.

Appropriations for fiscal year ending June 30, 1931:

For general use	$126,000
Salary of commissioner	4,800
Vaccines	10,000
Total	140,800

Other sources of revenue:
- Expenses of cooperative work with the Federal Government.
- Expenses of cooperative rural health work with the Rockefeller Foundation.

Publications issued by health department:
- Quarterly bulletin.
- Annual report.

WISCONSIN

Board of health:
- G. Windesheim, M. D., president, Kenosha.
- Joseph Dean, M. D., vice president, Madison.
- J. J. Seelman, M. D., Milwaukee.
- Mina B. Glasier, M. D., Bloomington.
- Stephen Cahana, M. D., Milwaukee.
- H. H. Ainsworth, M. D., Birchwood.
- C. A. Harper, M. D., State health officer, Madison.

Executive health officer:
- *C. A. Harper, M. D., State health officer, Madison.

Assistant State health officer:
- *G. W. Henika, M. D., Madison.

Deputy State health officers:
- *W. J. Miller, M. D., Madison.
- *G. E. Hoyt, M. D., Milwaukee.
- *V. A. Gudex, M. D., Oshkosh.
- *I. D. Wiltrout, M. D., Chippewa Falls.
- *R. L. Frisbie, M. D., Rhinelander.

Bureau of vital statistics:
- *C. A. Harper, M. D., State registrar, Madison.
- *L. W. Hutchcroft, statistician, Madison.

Bureau of communicable diseases:
- *H. M. Guilford, M. D., director, Madison.

Bureau of sanitary engineering:
- *L. F. Warrick, State sanitary engineer, Madison.
- *O. J. Muegge, assistant sanitary engineer, Madison.
- *E. J. Beatty, assistant sanitary engineer, Madison.
- *Harold Ruf, assistant sanitary engineer, Madison.
- *E. J. Tully, chemical engineer, Madison.

Bureau of education:
- *John Culnan, acting director, Madison.

Bureau of child welfare:
- *Charlotte Calvert, M. D., acting director, Madison.
- *Eleanor Hutchinson, M. D., child-health physician, Madison.
- *Margaret Nelson, M. D., child-health physician, Madison.
- *Margaret J. Hatfield, M. D., child-health physician.
- *Helen Thayer, organizer of infant hygiene courses, Madison.

Bureau of public-health nursing:
- *Cornelia Van Kooy, R. N., director, Madison.
- *Edith L. Olson, R. N., field advisory nurse, Madison.
- *Ada Newman, R. N., field advisory nurse, Madison.
- *Irene Vaud Reuil, R. N., field advisory nurse, Madison.

Bureau of nursing education.
- *Adda Eldredge, R. N., director, Madison.

Bureau of plumbing and domestic sanitary engineering:
- *Frank R. King, State domestic sanitary engineer, Madison.

Bureau of social hygiene:
- *H. M. Guilford, M. D., director, Madison.
- *Aimee Zillmer, lecturer, Madison.
- *D. M. Warner, lecturer, Madison.

Laboratory service:
- *W. D. Stovall, M. D., director, State laboratories, Madison.
- *M. S. Nichols, chemist, State laboratory, Madison.
- *Anna Brandsmark, director, branch laboratory, Rhinelander.
- *Mildred Englebert, director, cooperative laboratory, Beloit.
- *Marjorie Bates, director, cooperative laboratory, Oshkosh.
- *Henry Miller, director, cooperative laboratory, Kenosha.

Laboratory service—Continued.
- *Josephine Foote, director, cooperative laboratory, Wausau.
- *Martha Thompson, director, cooperative laboratory, Superior.
- *Clarissa McFetridge, director, cooperative laboratory, Green Bay.

Appropriations for fiscal year ending June 30, 1930:

General administration	$54,000
Emergency appropriation for epidemics	7,500
Branch laboratory and State cooperative laboratories	9,000
Prevention of infantile blindness	1,500
Venereal disease control work	36,370
Bureau of sanitary engineering	14,000
Bureau of communicable diseases	13,300
Prevention of stream and lake pollution	15,000
Bureau of child welfare and public-health nursing	51,000
Public health work and the investigation and prevention of disease among the Indians	15,000
Comfort station supervision	5,000
Licensing of embalmers, hotels and restaurants, plumbers, beauty parlors, nurses, and barbers	86,642
Total	308,312

Publications issued by health department:
- Quarterly bulletin.
- Biennial report.

WYOMING

Board of health:
- Albert B. Tonkin, M. D., president, Riverton.
- William H. Roberts, M. D., vice president, Sheridan.
- W. H. Hassed, M. D., secretary and executive officer, Cheyenne.
- Galen A. Fox, M. D., Cheyenne.
- B. V. McDermott, M. D., Hanna.

Executive health officer:
- ***W. H. Hassed, M. D.**, State health officer, Cheyenne.

Appropriations for biennial period ending Mar. 31, 1931:

State board of health	$11,000
Salary of secretary	8,000
Maternal and infant welfare	7,500
Bureau of vital statistics	3,500
Total	30,000

CITY HEALTH OFFICERS, 1930

Directory of Those in Cities of 10,000 or More Population

Directories of the city health officers in the cities of the United States having a population of 10,000 or more have been published in the Public Health Reports[1] for each year from 1916 to 1929 for the information of health officers and others interested in public-health activities. These directories have been compiled from data furnished by the health officers. The cities included in this directory are those whose populations have been estimated at 10,000 or more prior to the 1930 census.

The asterisk (*) indicates that the officer so designated has been reported to be a "whole-time" health officer. For this purpose a "whole-time" officer is defined as "one who does not engage in the practice of medicine or in any other business, but devotes all his time to official duties."

City	Name of health officer	Official title
Alabama:		
Anniston	*George A. Cryer, M. D.	County health officer.
Bessemer	*Robert V. Hazlewood, D. V. M.	Director of sanitation.
Birmingham	*J. D. Dowling, M. D.	County health officer.
Dothan	*Russell E. Neff, M. D.	Do.
Florence	*W. D. Hubbard, M. D.	County and city health officer.
Gadsden		
Mobile	*C. A. Mohr, M. D.	County health officer.
Montgomery	*J. L. Bowman, M. D.	Do.
Selma	*L. Tennent Lee, M. D.	County and city health officer.
Tuscaloosa	*A. A. Kirk, M. D.	Do.
Arizona:		
Douglas	Zachary Causey, M. D.	City health officer.
Phoenix	Harry J. Felch, M. D.	Do.
Tucson	Alvin Kirmse, M. D.	Do.
Arkansas:		
Fort Smith	*James Edward Johnson, M. D.	Medical director, United States Public Health Service.
Helena	*W. B. Bruce, M. D.	Do.
Hot Springs	*J. F. Merritt, M. D.	City and county health officer.
Jonesboro		
Little Rock	*C. R. Moon, M. D.	City health officer.
North Little Rock	James A. Summers, M. D.	City health officer and physician.
Pine Bluff	*George A. Hays, M. D.	Director, health department.
California:		
Alameda	Arthur Hieronymus, M. D.	Health officer and city physician.
Alhambra	*S. J. Stewart, M. D.	District health officer.
Bakersfield	Peter J. Cunoo, LL. B., M. D.	City health officer.
Berkeley	*Frank L. Kelly, M. D., D. P. H.	Health officer.
Chico	C. E. Tovee	City health officer.
Eureka	William J. Quinn, M. D.	Do.
Fresno	C. Mathewson, M. D.	Do.
Glendale	*D. E. Smallhorst, M. D.	District health officer.
Long Beach	*Grundy E. McDonald, M. D.	City health officer.
Los Angeles	*George Parrish, M. D.	Health officer.
	*G. S. Porter, M. D.	First assistant health officer.
	Divisional directors—	
	*G. F. Schmelzel, M. D.	Assistant health officer.
	*Harry Cohn, M. D.	Director of tuberculosis.
	*A. V. Nasatir, M. D.	Director of child welfare.
	*George M. Stevens, M. D.	Epidemiologist.
	*Agnes M. Talcott	Chief nurse.
	*C. F. Kiley	Acting chief accountant.
	*F. W. Peterson	Director of vital statistics.
	*John Carman	Chief chemist.
	*L. V. Dieter, Phar. D.	Director of laboratories.

[1] Reprints Nos. 346, 416, 494, 539, 599, 702, 767, 876, 930, 1025, 1103, 1177, 1257, and 1333 from the Public Health Reports.

City	Name of health officer	Official title
California—Continued.		
Los Angeles—Continued.	Divisional directors—Continued.	
	*Mona Bettin, M. D.	Chief bacteriologist.
	*F. D. Sweger	Director housing and sanitation.
	*William Veit, D. V. M.	Director milk and meat inspection.
	*H. H. Matthieson	Sanitary engineer.
	*John Nelson	Chief meat inspector.
	*Frank Mefferd	Chief fruit and vegetable inspector.
	*E. F. McGonigle	Chief clerk morbidity division.
	*A. M. Rogers, M. D.	Director venereal clinic (male).
	*Hannah J. Beatty, M. D.	Director venereal clinic (female)
	*Lyle McNeile, M. D.	Director maternity division.
	*C. K. Stewart	Director of rodent division.
	*J. M. Cain	Quarantine division.
Modesto	J. W. Morgan, M. D.	Health officer.
Oakland	Mark L. Emerson, M. D.	Do.
Pasadena	*J. D. Dunshee, M. D.	Do.
Pomona	*Eugene F. Fontaine, M. D.	District health officer.
Richmond	Chas. R. Blake, M. D.	Commissioner of health.
Riverside	*William B. Wells, M. D.	Health officer.
Sacramento	*Herbert F. True, M. D.	City health officer and registrar.
San Bernardino	W. W. Fenton, M. D.	City health officer.
San Diego	*Alex M. Lesem, M. D.	Health officer.
San Francisco	*William C. Hassler, Ph. G., M. D.	Health officer and local registrar.
Division of sanitation (includes epidemiological and disinfection).	——— ———	
Dairy, milk, and food division (includes industrial division).	Thomas P. Lydon	Chief of division.
Meat and market division.	Carl G. Hansen	Do.
Housing division	Homer P Thylo	Do.
Plumbing division	William D. Hobro	Do.
Child-welfare division (includes social service).	Eleanor Stockton, P. H. N.	Director field nursing.
School-health division	Thomas D. Maher, M. D.	Director of child hygiene.
Dental division	Robert Grosso, D. D. S.	Chief dentist.
Psychological division	Olga Bridgman, M. D.	Psychologist.
Chest clinic division (tuberculosis).	W. R. P. Clark, M. D.	Director.
Social hygiene division	R. W. Burlingame, M. D.	Chief clinician.
Bacteriological division.	Anna D. MacRae, M. D.	Director.
Chemical laboratory	Clinton Davis	Chief chemist.
Auditing division	Percy R. Hennessy	Auditor.
San Francisco Hospital.	Leon M. Wilbor, M. D.	Superintendent.
Laguna Honda Home	Charles M. Wollenberg	Do.
Emergency service	Edmund Butler, M. D.	Chief surgeon.
San Jose	*Henry C. Brown, M. D.	Health officer.
Santa Ana	*K. H. Sutherland, M. D.	County health officer.
Santa Barbara	*William H. Eaton, M. D.	Health officer.
Santa Cruz	John T. Harrington, M. D.	City health officer.
Santa Monica	*Wm. F. Reasner, M. D.	District health officer.
Stockton	*John J. Sippy, M. D.	Do.
Vallejo	Edward A. Peterson, M. D.	Health officer.
Colorado:		
Boulder	Carl H. Graf, M. D.	Director of public health.
Colorado Springs	O. R. Gillett, M. D.	City health officer.
Denver	*Bertram B. Jaffa, M. D.	Manager of health and charity.
Greely	Burgett Woodcock, M. D.	City health officer.
Pueblo	*W. E. Buck, M. D.	Chief, department of health.
Trinidad	Charles O. McClure, M. D.	City physician.
Connecticut:		
Ansonia	William H. O'Neil, M. D.	Health officer.
Bridgeport	*William F. Wild, M. D., C. P. H.	Do.
Bristol	Benjamin B. Robbins, M. D.	City health officer.
Danbury	James F. Young, M. D.	Health officer.
Derby	Thomas F. Plunkett, M. D.	Do.
East Hartford	Harvey B. Goddard, M. D.	Do.
Enfield	Frank F. Simonton, M. D.	Do.
Fairfield	*Laurence E. Poole, M. D., Dr. P. H.	Health officer and school physician.
Greenwich	Albert E. Austin, M. D.	Health officer.
Hartford	*Charles Porter Botsford, M. D.	Superintendent of health.
Manchester	D. C. Y. Moore, M. D.	Chairman, board of health.
Meriden	Joseph A. Cooke, M. D.	Health officer.
Middletown	John H. Mountain, D.D.S., M. D.	Do.
Milford	*Willis N. Butrick	Do.
Naugatuck		
New Britain	*Louis J. Dumont, M. D.	Superintendent of health.

City	Name of health officer	Official title
Connecticut—Continued.		
New Haven	*John L. Rice, M. D	Health officer.
New London	*Benjamin N. Pennell, D. V. S	Do.
Norwalk	Robert E. Perdue, M. D	Do.
Norwich	Edward J. Brophy, M. D	Do.
Orange		
Shelton	William S. Randall, Ph. B., M. D.	City health officer.
Stamford	*Raymond D. Fear, M. D., Dr. P. H.	Health commissioner.
Stonington (Mystic)	D. Edward Taylor, M. D	Health officer.
Stratford	De Ruyter Howland, M. D	Town health officer.
Torrington		
Wallingford		
Waterbury	*Edward J. Godfrey, M. D	City health officer.
West Hartford	L. A. Cushman, M. D	Health officer.
Willimantic	Nathan Spector, M. D	City health officer.
Windham		
Delaware:		
Wilmington	Fred F. Armstrong, M. D	Secretary, board of health.
District of Columbia:		
Washington	*William C. Fowler, M. D	Health officer.
	Edward J. Schwartz, M. D	Assistant health officer.
	Arthur G. Cole	Chief clerk and deputy health officer.
Bureau of preventable diseases.	James G. Cumming, M. D	Director.
Medical inspection of schools.	Joseph A. Murphy, M. D	Do.
Food inspection	Reid R. Ashworth, D. V. S	Do.
Sanitary inspection	J. Frank Butts, LL. B	Do.
Vital statistics	John H. Milligan	Do.
Chemical laboratory	John B. Reed	Do.
Bacteriological laboratory.	John E. Noble	Do.
Serological laboratory	Jesse P. Porch, D. V. M	Do.
Child welfare and hygiene service.	Hugh J. Davis, M. D	Do.
Pound	Walter R. Smith	Poundmaster.
Florida:		
Jacksonville	*Noble A. Upchurch, M. D	Health officer.
Key West	Harry C. Galey, M. D	City health officer.
Miami	*George N. MacDonell, M. D	Chief, division of health.
Orlando	Sylvan McElroy, M. D	City health officer.
Pensacola	Wm. D. Nobles, M. D	Do.
St. Petersburg	Wyman W. Harden, M. D	Health officer and city physician.
Tampa	*Chas. Wm. Bartlett, jr., M. D	City health officer.
West Palm Beach	W. E. Van Landingham, M. D	Do.
Georgia:		
Albany	*Hugo Robinson, Ph. G., M. D	District commissioner of health.
Athens	*T. H. Johnston, M. D., Dr. P.H.	Health commissioner.
Atlanta	*J. P. Kennedy, M. D	Health officer.
Augusta	Eugene E. Murphey, M. D	Commissioner of health.
Brunswick	*H. L. Akridge, M. D., D. P. H	Do.
Columbus	R. L. Williams, M. D	Health officer and city physician.
La Grange	*S. C. Rutland, M. D	County health officer.
Macon	*J. D. Applewhite, M. D	Health officer.
Rome	*B. V. Elmore, M. D	Commissioner of health.
Savannah	*Victor H. Bassett, M. D	District commissioner of health an city health officer.
Valdosta	*Gordon T. Crozier, M. D., Dr. P. H.	City health officer.
Waycross	*Geo. E. Atwood, M. D., Dr. P. H.	Commissioner of health.
Idaho:		
Boise	*W. H. Rhodes	Health officer.
Pocatello	H. H. Hughart, M. D	City physician.
Twin Falls		
Illinois:		
Alton	O. E. Carson, M. D	Health officer.
Aurora	Geo. W. Haan, M. D	Health officer and registrar.
Belleville	B. H. Portuondo, M. D	Public health officer.
Berwyn	*Preston E. Wright, M. D	Health director.
Bloomington	*Floyd E. Fielding, M. D	Director of public health.
Blue Island	*L. A. Burkhart	Commissioner of health.
Cairo	O. L. Weber, M. D	Health officer.
Canton		
Centralia	Gilford N. Welch, M. D	Do.
Champaign	W. E. Schowengerdt, M. D	Do.
Chicago	*Arnold H. Kegel, M. D	Commissioner of health.
	G. Koehler, M. D	Assistant health commissioner.
	H. O. Jones, M. D	Do.
Bureau of communicable diseases.	Isaac D. Rawlings, M. D	Chief of bureau.
Bureau of child welfare.	Henry C. Niblack, M. D	Do.
Bureau of dental hygiene.	Lon W. Morrey, D. D. S	Do.

City	Name of health officer	Official title
Illinois—Continued.		
Chicago—Continued.		
Bureau of laboratories and research.	F. O. Tonney, M. D	Chief of bureau.
Bureau of hospitals	Archibald L. Hoyne, M. D	Do.
Bureau of sanitary engineering.	Joel I. Connolly	Do.
Bureau of vital statistics.	M. O. Heckard, M. D	Do.
Bureau of dairy products.	Henry C. Becker, M. D. V	Do.
Bureau of food inspection.	J. P. Kilcourse	Do.
Bureau of inspection service.	J. M. Murphy, M. D	Do.
Chicago Heights	A. H. Pannenborg, M. D	Commissioner of health.
Cicero	Jacob J. Hood, M. D	Health commissioner.
Collinsville	R. H. Greaves, M. D	Health officer.
Danville		
Decatur	*Charles Raimer Smith, M. D	Director of public health.
East Moline	Henry Fowler, M. D	Health commissioner.
East St. Louis	*Albert P. Lauman	Do.
Elgin	*A. L. Mann, M. D	Executive officer, health department.
Evanston	*John W. H. Pollard, B. L., M. D.	Commissioner of health.
Forest Park	Wm. C. Masslow, M. D	Do.
Freeport	E. L. Motsinger, M. D	Do.
Galesburg	E. D. Wing, M. D	Health commissioner.
Granite City	L. D. Darner, M. D	Do.
Harvey		
Herrin	C. C. Humphrey	President, board of health.
Jacksonville		
Joliet	*Ed. J. Higgins, M. D	Commissioner of health.
Kankakee	*C. K. Smith, M. D	Health officer.
Kewanee	H. N. Heflin, M. D	Commissioner of health.
La Salle	*Arlington Ailes, M. D., C. P. H	Do.
Lincoln	Wilbur Montgomery	Health officer.
Marion	Alonzo N. Baker, M. D	Health commissioner.
Mattoon	T. O. Freeman, M. D	Do.
Maywood	Robert L. Reynolds, M. D	Do.
Moline	E. A. Edlen, M. D	City physician.
Mount Vernon		
Murphysboro	Louis R. Wayman, M. D	Health officer.
Oak Park	Frank S. Needham, M. D	Commissioner of health.
Ottawa	Paul G. Pomeroy, M. D	Health officer.
Pekin	L. R. Clary, M. D	City health officer.
Peoria	*Sandor Horwitz, M. D	Commissioner of health.
Quincy	*Thomas W. Rhodes, Ph. G., M. D.	Public health officer.
Rock Island	Ralph Dart, M. D	City physician.
Rockford	*N. O. Gunderson, M. D	Commissioner of health.
Springfield	H. H. Tuttle, M. D	Superintendent of health.
Streator	D. S. Conley, M. D	City physician.
Urbana	Geo. F. Way, M. D	City health officer.
Waukegan	Howard C. Hoag, M. D	City health physician.
West Frankfort	C. E. Koons, M. D	City health officer.
Indiana:		
Anderson	E. M. Conrad, M. D	Secretary, city board of health.
Bloomington	R. A. De Motte, M. D	City health officer.
Clinton	E. A. Evans, M. D	Secretary, board of health.
Connersville	Herman W. Smelser, M. D	Health officer.
Crawfordsville	Fred N. Daugherty, M. D	Secretary, board of health.
East Chicago	Frank Henry Mervis, Ph. G., M. D.	Do.
Elkhart	I. J. Markel, M. D	Do.
Elwood	T. S. Owen, M. D	City health officer.
Evansville	L. E. Fritsch, M. D	Secretary, board of health.
Fort Wayne	C. G. Miller, M. D	Do.
Frankfort	O. A. Zinn, M. D	Do.
Gary	Walter M. Behn, M. D	Do.
Hammond	J. A. Chevigny, M. D	Health commissioner.
Huntington	R. F. Frost, M. D	Secretary, city board of health.
Indianapolis	*Herman G. Morgan, M. D	Health commissioner.
Jeffersonville	Samuel L. Adair, M. D	City health officer.
Kokomo	T. C. Cochran, M. D	Do.
La Fayette	M. M. Lairy, M. D	Secretary, city board of health.
La Porte	Jon Nelson Kelly, M. D	Health officer.
Logansport	*Louis P. Deuner	Health inspector.
Marion	L. H. Eshleman, M. D	Secretary, board of health.
Michigan City	Nelle C. Reed, M. D	Do.
Mishawaka	M. D. Wygant, M. D	Do.
Muncie	Herbert D. Fair, Ph. G., M. D	Do.
New Albany	A. I. McKamy, Ph. D., M. D	Do.

City	Name of health officer	Official title
Indiana—Continued.		
Newcastle	Walter Moses Stout, M. D	Secretary, board of health.
Peru	W. H. Wagoner, M. D	Do.
Richmond	M. F. Johnston, M. D	Health commissioner.
South Bend	J. B. Berteling, M. D	Secretary, board of health.
Terre Haute	John E. Dailey, M. D	Do.
Vincennes	Robert G. Moore, M. D	Do.
Wabash	Lester B. Rhamy, M. D	Do.
Whiting	B. B. Reeve, M. D	Do.
Iowa:		
Boone	Wm. Woodburn, M. D	Health officer.
Burlington	George H. Steinle, M. D	Health officer and city physician.
Cedar Rapids	B. G. Broghammer, M. D	Health officer.
Clinton	Frank A. Hohenschuh, M. D	Health officer and city physician.
Council Bluffs	D. C. Hankey, M. D	City health officer.
Davenport	*Theodore J. Meyer	Health officer.
Des Moines	*Harley L. Sayler, M. D	Health commissioner.
Dubuque	Walter J. Connell, M. D., M. P. H.	Health director.
Fort Dodge	James P. Sharon, M. D	City physician.
Fort Madison	Harold F. Noble, M. D	Do.
Iowa City	Francis L. Love, M. D	City health physician.
Keokuk	*Richard Evans	Sanitation officer.
Marshalltown	M. U. Chesire, M. D	Health officer.
Mason City	C. E. Dakin, M. D	Director, department of health and sanitation.
Muscatine	Rodney M. Arey, M. D	City health physician.
Ottumwa		
Sioux City	*Benjamin Courshon, M. D	Acting commissioner of public health and city physician.
Waterloo	Joseph E. Ridenour, M. D	Health physician.
Kansas:		
Arkansas City	E. W. Hellweg, M. D	City physician.
Atchison	Chas. W. Robinson, M. D	City and county health officer.
Chanute	James A. Butin, M. D	City health officer.
Coffeyville	A. Boese, M. D	City physician and health officer.
Eldorado	R. J. Cabeen, M. D	County health officer.
Emporia	*J. S. Fulton, M. D	Field Agent, United States Public Health Service.
Fort Scott	C. L. Mosley, M. D	City health officer.
Hutchinson	Guy R. Walker, M. D	City physician.
Independence	Enoch C. Wickersham, M. D	County health officer.
Kansas City	*S. D. Henry, M. D	Director of health and sanitation.
Lawrence	E. R. Keith, M. D	City health officer.
Leavenworth	A. L. Suwalsky, M. D	City physician.
Newton	F. G. Bartel, M. D	County health officer.
Parsons	M. C. Ruble, M. D	City physician.
Pittsburg	H. J. Veatch, M. D	City health officer.
Salina	S. T. Blades, M. D	Health officer.
Topeka	*Aurel Goodwin, M. D	Secretary, city board of health.
Wichita	*Russell E. Hobbs, M. D	Director of public welfare.
Kentucky:		
Ashland		
Covington	J. P. Riffe, M. D	City health officer.
Henderson	*Robert K. Galloway, M. D., M. P. H.	County health officer.
Lexington	*Charles H. Voorhies, M. D	Health officer.
Louisville	C. H. Harris, M. D	Director of health.
Newport		
Owensboro	*George L. Thompson, M. D	Do.
Paducah	H. P. Linn, M. D	City health officer.
Louisiana:		
Alexandria	J. A. Packer, M. D	President, board of health.
Baton Rouge	T. Jeff McHugh, M. D	City health officer.
Lake Charles	H. B. White, M. D	Do.
Monroe	D. I. Hirsch, M. D	President, board of health.
New Orleans	*William H. Robin, M. D	Parish and city health officer.
Shreveport	*Arthur G. Heath, M. D	President, board of health.
Maine:		
Auburn	E. Leathers, M. D	Health officer.
Augusta	George A. Coombs, M. D	Do.
Bangor	*Harry D. McNeil, M. D	Local health officer.
Bath	H. B. Duce, D. O	City health officer.
Biddeford	John W. Mahoney	Local health officer.
Lewiston	*Robert J. Wiseman, jr., M. D	Health officer.
Portland	*Thomas Tetreau, M. D	Do.
Sanford	*C. W. Blagden, M. D	Do.
South Portland	Waldo T. Skillin, M. D	Do.
Waterville	*Arthur R. Daviau, M. D	Do.
Westbrook	Patrick H. Welch	Local health officer.

City	Name of health officer	Official title
Maryland:		
Annapolis		
Baltimore	*C. Hampson Jones, M. D	Commissioner of health and registrar of vital statistcis.
	*J. Frederick Hempel, M. D	Assistant commissioner of health.
Bureau of bacteriology	*C. Leroy Ewing	Director.
Bureau of chemistry and food.	*R. S. Craig	Do.
Bureau of meat inspection.	*William Brenner, M. D	Do.
Bureau of communicable diseases.	*Daniel S. Hatfield, M. D	Do.
Bureau of sanitation	*J. Frederick Hempel, M. D	Do.
Bureau of nursing	*Mrs. J. B. Laib	Do.
Bureau of child welfare.	*William H. F. Warthen, M. D	Do.
Bureau of vital statistics.	*Howard A. Moore	Do.
Bureau of hospitals	*Myron G. Tull, M. D	Do.
Cumberland	*Harvey H. Weiss	Health officer and registrar of vital statistics.
Frederick	*E. C. Kefauver, M. D	County and city health officer.
Hagerstown	Ernest F. Poole, M. D	County health officer.
Massachusetts:		
Adams	J. F. McLaughlin, M. D	Chairman, board of health.
Amesbury	Clarence S. Morse	Agent, board of health.
Arlington	*William H. Bradley	Do.
Athol	Marion B. Sibley, M. D	Secretary, board of health.
Attleboro	William O. Hewitt, M. D	Health officer.
Belmont	*Thomas F. Harris	Agent, board of health.
Beverly	*Alonzo O. Woodbury	Do.
Boston	*Francis X. Mahoney, D. V. M., M. D.	Health Commissioner.
Divisions—		
Medical	*M. Victor Safford, M. D	Deputy commissioner.
Communicable diseases.	*Frederick J. Bailey, M. D	Do.
Bacteriological laboratory.	*Karl R. Bailey, M. D	Do.
Food	*P. H. Mullowney, D. V. M	Do.
Child hygiene	Charles F. Wilinsky, M. D	Do.
Sanitary	*Thomas J. Donnellon	Do.
Tuberculosis	*George O'Donnell, M. D	Director.
Braintree	Harry F. Vinton	Agent, board of health.
Brockton	Joseph H. Lawrence, M. D	Health officer.
Brookline	Francis Parkman Denny, M. D	Do.
Cambridge	Simon B. Kelleher, M. D	Medical inspector.
Chelsea	*John F. Welch	Health officer.
Chicopee	*Gertrude M. De Witt	Agent, board of health.
Clinton	*Frederick E. Murphy	Do.
Danvers	*Hugo Nappe, R. N	Health officer.
Dedham		
Easthampton	C. C. Buckner	Agent, board of health.
Everett	*William F. Hogan	Do.
Fall River	*Ernest M. Morris, M. D., C. M	Health commissioner.
Fitchburg	*Fred R. Brigham	Agent, board of health.
Framingham	*David Moxon, C. P. H	Do.
Gardner	*William P. O'Donnell	Do.
Gloucester	*P. E. Curley	Sanitary inspector.
Greenfield	*George P. Moore	Agent, board of health.
Haverhill	*George T. Lennon	Do.
Holyoke	*Daniel D. Mahoney	Do.
Lawrence	Aime D. V. Bourget	Chariman, board of health.
Leominster	*Hugh E. Crain	Agent, board of health.
Lowell	*John J. McNamara, M. D	Acting health officer.
Lynn	James A. Dumas, M. D	Commissioner of public health.
Malden	*May C. Welsh	Agent, board of health.
Marlboro	*John J. Cassidy	Do.
Medford	William Lanigan, M. D	Health officer.
Melrose	Clarence P. Holden, M. D	Chairman, board of health.
Methuen	*Albert Slack	Clerk, board of health.
Milford	Oscar C. Ayotte	Secretary, board of health.
Milton	Paul W. Kimball, M. D	Agent, board of health.
Natick	Thomas F. Morris	Do.
New Bedford	*William G. Kirschbaum	Agent and executive officer.
Newburyport	*Wilbur N. O'Brien, Ph. G	Agent, board of health.
Newton	*Francis George Curtis, M. D	Chairman, board of health.
North Adams	*D. W. Hyde, S. E	Agent, board of health.
Northampton	George R. Turner	Do.
Northbridge	D. C. Duggan	Chairman, board of health.
Norwood	James G. Mulvehill	Agent, board of health.
Palmer	J. P. Schneider, M. D	Chairman, board of health.
Peabody	*Percy F. Murray	Agent, board of health.
Pittsfield	*Willys M. Monroe, M. D	Health officer.
Plymouth	Walter D. Shurtleff, M. D	Do.

City	Name of health officer	Official title
Massachusetts—Continued.		
Quincy	Edmund B. Fitzgerald, M. D.	Health commissioner.
Revere	Francis Licata, M. D.	Chairman, board of health.
Salem	*John J. McGrath	Agent, board of health.
Saugus	*Charles E. Light	Chairman, board of health.
Somerville	Frank L. Morse, M. D.	Medical inspector.
Southbridge	*Albert R. Brown	Agent, board of health.
Springfield	*Jacob R. Sackett	Agent and health officer.
Taunton	Thomas F. Cusick, M. D.	Chairman, board of health.
Wakefield	David Taggart	Health officer.
Waltham	Frederick L. MacDonald, M. D.	Director of public welfare.
Watertown	*Arthur E. Burke, C. P. H., B. Sc. in P. H.	Agent, board of health.
Webster	Bernard L. Plouffe, M. D.	Chairman, board of health.
West Springfield	J. J. Lysaght	Agent, board of health.
Westfield	Robert M. Marr, M. D.	Chairman, board of health.
Weymouth	F. L. Doucett, M. D.	Clerk, board of health.
Winchester	*Maurice Dinneen	Agent, board of health.
Winthrop	*William D. Childress	Health officer.
Woburn	*Edward F. Gorman	Agent and secretary.
Worcester	*Thomas F. Kenney, M. D.	Director of health and school hygiene.
Michigan:		
Adrian	J. P. Bland, M. D.	Health officer.
Alpena		
Ann Arbor	John A. Wessinger, M. D.	Do.
Battle Creek	*A. A. Hoyt, M. D.	Health officer and registrar.
Bay City	G. W. Moore, M. D.	Health officer.
Benton Harbor	E. R. Taylor, M. D.	Director of public health.
Cadillac	*S. C. Moore, M. D.	Health commissioner.
Dearborn	C. A. Christensen, M. D.	Commissioner of health.
Detroit	Board of health—	
	William H. Maybury	President.
	William A. Evans, M. D.	Vice president.
	L. O. Geib, M. D.	
	Gustavus D. Pope	
	Executive staff, department of health—	
	*Henry F. Vaughan, D. P. H.	Commissioner of health.
	Bert U. Estarbrook, M. D.	Deputy commissioner.
	*Fred M. Meader, M. D.	Deputy commissioner and director of medical service.
	*Carl E. Buck, D. P. H.	Deputy commissioner and executive officer.
	*John F. Norton, Ph. D.	Director of laboratories.
	A. C. Thompson, D. D. S.	Director of school dental service.
	*Miss Grace Ross, R. N.	Superintendent of nursing.
	Ward F. Seeley, M. D.	Director of Herman Kiefer Hospital maternity division.
	Russell W. Alles, M. D.	Director prenatal division.
	*Major John F. Roehl	Director of special investigation.
	*R. S. Dixon, M. D.	Director of division of venereal diseases.
	*Henry D. Chadwick, M. D.	Tuberculosis controller.
	*B. H. Douglas, M. D.	Superintendent of William H. Maybury Sanatorium.
	*George E. Phillips	Superintendent of Herman Kiefer Hospital.
	*F. Gardner Legg, C. E.	Director of sanitary engineering.
	*Edward C. Schultz	Director of dairy and food inspection.
	*Arthur P. Derby, M. D.	Director of division of tuberculosis.
	Don W. Gudakunst, M. D.	Director of division of school health service.
	Don J. Barnes, M. D.	Director of division of child welfare.
	*F. B. Broderick, M. D.	Director of division of hairdressers and cosmeticians.
	*G. Arthur Blakeslee	Director of division of vital statistics.
	C. E. Dutchess, M. D.	Director of division of cancer control.
	*John E. Gordon, M. D.	Epidemiologist.
Escanaba		
Flint	Don D. Knapp, M. D.	Health officer.
Grand Rapids	*Allison H. Edwards, M. D.	Do.
Hamtramck	C. R. Sheridan, M. D.	Health commissioner.
Highland Park	Wm. N. Braley, M. D.	Health officer.
Holland	Wm. Westrate, M. D.	Do.
Ironwood	*Louis Dorpat, M. D.	Do.
Ishpeming	*George G. Barnett, M. D.	City health officer.
Jackson	*Floyd R. Town, M. D.	Health officer.
Kalamazoo	*Alvin H. Rockwell, M. D.	Do.
Lansing	*S. Rowland Hill, M. D.	Health director.
Marquette	*T. R. Laughbaum, M. D.	Health officer.
Monroe		
Mount Clemens	W. J. Kane, M. D.	Do.
Muskegon	R. J. Harrington, M. D.	Do.
Muskegon Heights		
Owosso	Harry T. Gray, M. D.	City health officer.

City	Name of health officer	Official title
Michigan—Continued.		
Pontiac	*C. A. Neafie, M. D., M. S. P. H.	Director of public health.
Port Huron	A. L. Callery, M. D	Health officer.
River Rouge	Claud Smith, M. D	Do.
Saginaw	*Garland Weidner, M. D	Do.
Sault Ste. Marie	E. A. Cornell, M. D	Do.
Traverse City	George A. Holliday, D.D.S., M.D.	Do.
Wyandotte	Arthur P. Schulz, M. D	Commissioner of health and sanitation.
Minnesota:		
Albert Lea	*C. J. Scheldrup	Health inspector.
Austin	J. K. McKenna, M. D	Health officer
Brainerd		
Duluth	Lincoln A. Sukeforth, M. D	Director of health.
Faribault	Fred U. Davis, M. D	Health commissioner.
Hibbing	Theo. A. Estrem, M. D	Health officer.
Mankato	John A. Butzer, M. D	Do.
Minneapolis	*Francis E. Harrington, LL. D., M. D.	Commissioner of health.
Rochester	C. H. Mayo, M. D.[1]	Health officer.
St. Cloud	*J. N. Libert, M. D	City physician.
St. Paul	*B. F. Simon, M. D	Health officer.
Virginia	Robert P. Pearsall, M. D	Do.
Winona	William V. Lindsay, M. D	Do.
Mississippi:		
Biloxi	George F. Carroll, M. D	City health officer.
Columbus	W. L. Stallworth, M. D	Do.
Greenville	*Jno. W. Shackelford, M. D.	Director, county health department.
Hattiesburg	*W. D. Beacham, M. D	Do.
Jackson	*W. E. Noblin, M. D	City and county health officer.
Laurel	R. H. Foster, M. D	Acting city health officer.
Meridian	*J. T. Googe, M. D	Director, county health department.
Natchez	*Loren Wallin, M. D	Do.
Vicksburg	*F. Michael Smith, M. D	Do.
Missouri:		
Cape Girardeau	*Philip H. Steck	Health commissioner.
Carthage	Ephraim D. Hatcher, M. D.	City physician.
Columbia	W. A. Norris, M. D	City health commissioner.
Hannibal	*E. M. Lucke, M. D	Field agent, United States Public Health Service.
Independence	F. L. Cook, M. D	City physician and milk inspector.
Jefferson City	William A. Clark, M. D.	City health officer.
Joplin	*M. B. Harutun, M. D	Commissioner of health and sanitation.
Kansas City	*Calvin L. Cooper, M. D	Director of health.
Moberly	Jesse Maddox, M. D	City health Commissioner.
St. Joseph	A. J. Smith, M. D	Health officer.
St. Louis	*Max C. Starkloff, M. D	Health commissioner.
	*Max Kaufman	Deputy health officer.
Sanitary section	*Walter Cook	Director.
Vital statistics section	*Leon Grosch	Do.
Dental section	*Dr. Horbard Towles	Do.
Chemical-bacteriological section.	*Thomas Buckland	Chief chemist.
	*Dr. J. C. Willett	Chief bacteriologist.
Communicable disease section.	*Dr. J. A. Smith	Director.
Venereal disease section.	*Dr. Eugene Brown	Chief physician.
Municipal visiting nurses.	*Mrs. Bertha Yenicek	Director.
Tuberculosis controller.	*Dr. Howard Dell	Do.
Sedalia		
Springfield	*Lon Sharp	Commissioner of health and sanitation.
Webster Groves	Carl C. Irick, M. D	Health commissioner.
Montana:		
Anaconda	J. L. O'Rourke, M. D	City physician.
Billings	Albert E. Stripp, M. D	City health officer.
Butte	Joseph J. Kane, M. D	City physician.
Great Falls	*Frank L. Watkins, M. D	Field agent, United States Public Health Service.
Helena	*Arthur Jordan, M. D	Do.
Missoula	*F. D. Pease, M. D	Health officer.
Nebraska:		
Grand Island	J. G. Woodin, M. D	City physician.
Lincoln	M. F. Arnholt, M. D	Superintendent of health.
North Platte	J. B. Redfield, M. D	City physician.
Omaha	A. S. Pinto, M. D	Health commissioner.
Nevada:		
Reno	A. F. Adams, Ph. G., M. D	Secretary, board of health.

[1] Full-time deputy health officer, D. C. Lochead, M. D., D. P. H.

City	Name of health officer	Official title
New Hampshire:		
Berlin	*Eli A. Marcoux	Health officer and milk inspector.
Claremont	William P. Prescott	Health officer.
Concord	*Charles E. Palmer	Sanitary officer.
Dover	*Wm. E. Whiteley	Executive officer.
Keene	*Fred C. Nims	Health officer.
Laconia	J. Russell Perley, M. D	Member, board of health.
Manchester	*Howard A. Streeter, M. D	Health officer.
Nashua	*P. J. McLaughlin, M. D	Do.
Portsmouth		
Rochester	C. E. Goodwin	Do.
New Jersey:		
Asbury Park	*B. H. Obert	Do.
Atlantic City	S. L. Salasin, M. D	Do.
Bayonne	W. W. Brooke, M. D	Do.
Belleville	*Eugene T. Berry	Do.
Bloomfield	*Joseph C. Saile, Ph. G., D. V. S., D. O.	Do.
Bridgeton	*John G. Robbins	Sanitary inspector.
Camden	*A. L. Stone, M. D	Director of public health.
Cartaret	H. L. Strandberg, M. D	Health officer.
Clifton	Jeremiah P. Quinlan	Do.
Collingswood	Harold K. Eynon, M. D	Medical inspector.
Dover	*John G. Taylor	Health officer.
East Orange	*Frank J. Osborne	Health officer and registrar.
Elizabeth	*Louis J. Richards, S. B. in S. E.	Health officer.
Englewood	*John A. Manson	Sanitary inspector.
Garfield	Chas. B. Bleasby, M. D	Health officer.
Gloucester City	J. Alonzo Beck, M. D	Do.
Hackensack	*L. Van D. Chandler	Do.
Harrison	*John T. McClure	Do.
Hoboken	*J. F. X. Stack, M. D	Health commissioner.
Irvington	*William S. Bailey	Acting health officer.
Jersey City	*James J. Hagan	Health officer.
Kearny	*Amos Field, jr	Do.
Lodi	H. H. Brevoort, M. D	Health inspector.
Long Branch	*R. C. Errickson	Health officer.
Millville	Richard H. Knowles, Ph. G	Do.
Montclair	*Carl T. Pomeroy, C. P. H	Do.
Morristown	*John F. Kilkenny	Do.
New Brunswick	E. I. Cronk, M. D	Do.
Newark	*Charles V. Craster, M. D., D. P. H.	Do.
Nutley	*Eugene H. Sullivan, R. N	Health officer and registrar of vital statistics.
Orange	*Lenore Y. Wylie, R. N	Do.
Passaic	John N. Ryan, M. D	Health officer.
Paterson	*Fred P. Lee, M. D	Do.
Perth Amboy	*Chas. S. Thompson, D. V. S	Do.
Phillipsburg	Alma L. Williston, M. D	Do.
Plainfield	*N. J. Randolph Chandler	Do.
Rahway	*Fred M. Williams	Do.
Ridgefield Park	*W. F. Reynolds, D. V. M	Do.
Rutherford	*Marine Dunn	Sanitary inspector.
Summit	Henry Paul Dengler, M. D	Health officer.
Trenton	*Alton S. Fell, M. D	Do.
Union City	Grant P. Curtis, M. D	Do.
Weehawken	J. M. Stein, M. D	Town physician.
West New York	*Rudolph Kunze	Chief inspector.
West Orange	*David E. Buckley	Health officer.
Westfield	*Andrew Carney	Do.
New Mexico:		
Albuquerque	*James R. Scott, Ph. D., M. D	County health officer.
New York:		
Albany	James W. Wiltse, M. D	Health officer.
Amsterdam	P. J. Fitzgibbons, M. D	Do.
Auburn	John W. Copeland, M. D	Do.
Batavia	Emery F. Will, M. D	Do.
Beacon	Charles B. Dugan, M. D	Do.
Binghamton	Chalmer J. Longstreet, M. D	Do.
Buffalo	*Francis E. Fronczak, LL. D., M. D., Dr. Sc. P. H.	Health commissioner.
	*Edward Durney, M. D	Duputy health officer.
	*Charles A. Bentz, M. D	Do.
Division of child hygiene.	*Edward Durney, M. D	Director.
Communicable disease and division of laboratories.	*Charles A. Bentz, M. D	Do.
Division of vital statistics.	*G. H. Westinghouse, M. D	Registrar.
Division of sanitation	*Frank Smering	Superintendent.
Division of food and drugs.	*Stephen Bateson	Do.

City	Name of health officer	Official title
New York—Continued.		
Cohoes	Matthew J. Keough, M. D	Commissioner of health.
Corning	Henry E. Elwood, jr., M. D	Health officer.
Cortland	*Daniel R. Reilly, M. D	Health commissioner.
Dunkirk	George E. Ellis, M. D	Health officer.
Elmira	Reeve B. Howland, M. D	Do.
Endicott	D. W. Hardy, M. D	Do.
Freeport	William H. Runcie, M. D	Do.
Fulton	L. A. Simpson, M. D	Do.
Geneva	C. W. Grove, M. D	Do.
Glens Falls	*Virgil D. Selleck, M. D., C. P. H.	Do.
Gloversville	Alex. L. Johnson, M. D	Do.
Herkimer	James W. Graves, M. D	Do.
Hornell	George E. Taylor, M. D	Do.
Hudson	William D. Collins, M. D	Do.
Ilion	Frank B. Conterman, M. D	Do.
Ithaca	*Lewell T. Genung, M. D	Do.
Jamestown	William M. Sill, M. D	Superintendent of public health.
Johnson City	Rollin O. Crosier, M. D	Health officer.
Johnstown	Guy Vail Wilson, M. D	Do.
Kingston	Lester E. Sanford, M. D	Do.
Lackawanna	A. S. Culkowski, M. D	Do.
Little Falls	George S. Eveleth, M. D	Do.
Lockport	Ferdinand A. Kittinger, M. D	Do.
Middletown	H. J. Shelley, M. D	Do.
Mount Vernon	Frank W. Shipman, M. D	Commissioner of health.
New Rochelle	*Edwin H. Codding, M. D	Health officer.
New York	*Shirley W. Wynne, M. D., Dr. P. H.	Commissioner of health.
	Herman T. Peck, M. D	Deputy commissioner of health.
Bureau—		
General administration.	Bernard F. Plunkett	Director.
Records		Do.
Sanitation	William H. Pound, M. D	Do.
Preventable diseases.	Edward L. Creeden, M. D	Acting director.
Child hygiene	Jules L. Blumenthal, M. D	Director.
Nursing	Miss Amelia H. Grant	Do.
Public health education.	Charles F. Bolduan, M. D	Do.
Laboratories	William H. Park, M. D	Do.
Food and drugs	B. H. Geertsema	Acting director.
Newburgh	Thomas J. Burke, M. D	Health officer.
Niagara Falls	E. E. Gillick, M. D	Do.
North Tonawanda	Henry C. Lapp, M. D	Do.
Ogdensburg	John W. Benton, M. D	Do.
Olean	John A. Johnson, M. D	Health commissioner.
Oneida	Donald H. Conterman, M. D	Health officer.
Oneonta		
Ossining	Robert R. Bloom, M. D	Do.
Oswego	Harvey S. Albertson, M. D	Do.
Peekskill	Harold H. Golding, M. D	Do.
Port Chester	William J. Sheehan, M. D	Do.
Port Jervis	G. Otto Pobe, M. D	City health officer.
Poughkeepsie	*William H. Conger, M. D	Health officer.
Rensselaer	Charles H. Harbinson, M. D	Do.
Rochester	*George W. Goler, M. D	Do.
Rome	Lewis N. Eames, M. D	Do.
Salamanca	P. H. Bourne, M. D	Do.
Saratoga Springs	Charles B. Small, M. D	City health officer.
Schenectady	John H. Collins, M. D	Commissioner of health.
Syracuse	*George C. Ruhland, M. D	Do.
Tonawanda	John T. Harris, M. D	Health officer.
Troy	James H. Flynn, M. D	Commissioner of health.
Utica	Hugh H. Shaw, M. D	Health officer.
Watertown	George B. Van Doren, M. D	City health officer.
Watervliet	Charles A. Birmingham, M. D	Commissioner of health.
White Plains	Edwin G. Ramsdell, M. D	Health officer.
Yonkers	Clarence W. Buckmaster, M. D., C. P. H.	Commissioner of health.
North Carolina:		
Asheville	*D. E. Sevier, M. D	Health officer.
Charlotte	*Wilbur Ashley McPhaul, M. D	Superintendent of health.
Concord	*Daniel Greenlee Caldwell, M. D	County health officer.
Durham	*Jesse H. Epperson, M. S., bacteriology and chemistry.	Superintendent of health.
Gastonia	Mc. G. Anders, M. D	City physician and health officer.
Goldsboro	*L. W. Corbett, M. D	Superintendent of health.
Greensboro	*C. Curtis Hudson, M. D	Health officer.
High Point	Samuel S. Coe, M. D	City physician.
Kinston	*Robert S. McGeachy, M. D	Health officer.
New Bern	*D. E. Ford, M. D	County health officer.
Raleigh	*A. C. Bulla, M. D	Health officer.

City	Name of health officer	Official title
North Carolina—Continued.		
Rocky Mount	*Thurman H. Rose, M. D	Superintendent of health.
Salisbury	*Charles Wallace Armstrong, M. D.	City and county health officer.
Wilmington	*John H. Hamilton, M. D	County health officer.
Wilson	*L. J. Smith, M. D	Health officer.
Winston-Salem	*R. L. Carlton, M. D	City health officer.
North Dakota:		
Fargo	*B. K. Kilbourne, M. D	City health officer.
Grand Forks	E. C. Haagensen, M. D	Do.
Ohio:		
Akron	*M. D. Ailes, LL. B., M. D	Director of health.
Alliance	Earl Mussleman, LL. B., M. D	Health commissioner.
Ashland	C. B. Menser, M. D	Director of welfare.
Ashtabula	A. J. Pardee, M. D	Health officer.
Barberton	W. A. Mansfield, M. D	Health commissioner.
Bellefontaine	A. J. McCracken, M. D	City health commissioner.
Bucyrus	W. G. Carlisle, M. D	Health commissioner.
Cambridge	C. L. Vorhies, M. D	Do.
Campbell	Jas. S. Mariner, M. D	Do.
Canton	F. M. Sayre, M. D	Do.
Chillicothe	*Raymond E. Bower, Ph. B., M. D.	Do.
Cincinnati	*Wm. H. Peters, M. D	Do.
Cleveland	*H. L. Rockwood, M. D	Commissioner of health.
Division—		
Communicable diseases.	T. G. Duncan, M. D	Director.
Child hygiene	R. J. Ochsner, M. D	Do
Food and drug administrtion.	H. J. Knapp, M. D	Do.
Meat and dairy	R. F. Leslie, D. V. M	Do.
Cleveland Heights	*Robert Lockhart, M. D	Director of health.
Columbus	*Nelson C. Dysart, Ph. C., M. D	Health commissioner.
Coshocton	*D. M. Criswell, M. D	Do.
Cuyahoga Falls	*R. H. Markwith, M. D	Do.
Dayton	*A. O. Peters, M. D	Do.
East Cleveland	G. W. Stober, M. D	Director of health.
East Liverpool	Edward W. Miskall, M. D	Health commissioner.
Elyria	G. E. French, M. D	Do.
Findlay	*K. B. Clark	Do.
Fostoria	*A. V. Parsell	Do.
Fremont	E. L. Vermilya, M. D	Do.
Hamilton	*C. J. Baldridge, B. L., M. D	Do.
Ironton	H. S. Allen, M. D	Do.
Lakewood	Wallace J. Benner, M. D	Do.
Lancaster	Clifford B. Snider, M. D	Do.
Lima	J. B. Poling, M. D	Do.
Lorain	Valloyd Adair, M. D	Do.
Mansfield	*Theodore R. Meyer, M. D	Do.
Marietta	J. B. McClure, M. D	Do.
Marion	*N. Sifritt, M. D	Do.
Martins Ferry	*John Donovan	Do.
Massillon	*John H. Williams	Do.
Middletown	*George D. Lummis, M. D	Do.
New Philadelphia	*Joseph Blickensderfer, M. D	Do.
Newark	W. H. Knauss, M. D	Do.
Niles	W. A. Werner, M. D	Do.
Norwood	L. O. Saur, M. D	Do.
Piqua	L. G. Whitney	Do.
Portsmouth	*R. W. De Crow, M. D	Do.
Salem	T. T. Church, M. D	Do.
Sandusky	* F. M. Houghtaling, M. D	Do.
Springfield	*Howard C. Lisle, Ph. G., M. D	Health director.
Steubenville	*Julius A. Pizzoferrato	Health commissioner.
Tiffin	J. A. Gosling, M. D	Do.
Toledo	*John L. Lavan, M. D	Do.
Warren	M. T. Knappenberger, M. D	Do.
Youngstown	H. E. Welch, M. D	Do.
Zanesville	David J. Evans, M. D	Do.
Oklahoma:		
Ardmore	Ambert Young Easterwood, M. D.	City health officer.
Bartlesville	Elizabeth Chamberlin, M. D	City superintendent of health.
Chickasha	H. C. Antle, M. D	Do.
Enid	R. C. Baker, M. D	Do.
Guthrie	Wm. C. Miller, M. D	City physician and health officer.
McAlester	*Chas. M. Pearce, M. D	Superintendent of health.
Muskogee	A. W. Harris, M. D	City health officer.
Oklahoma City	*Walter H. Miles, M. D	Director of health.
Okmulgee		
Sapulpa	J. M. Mattenlee, M. D	City physician.
Shawnee	T. C. Sanders, M. D	City superintendent of health.
Tulsa	*Harry J. McGuire, M. D	Superintendent of health.

City	Name of health officer	Official title
Oregon:		
Astoria	Nellie S. Vernon, M. D	City and county health officer.
Eugene	Seth M. Kerron, M. D	City health officer.
Portland	*John G. Abele, M. D	Do.
Salem	*V. A. Douglas, M. D	Do.
Pennsylvania:		
Aliquippa	*James E. Tanner	Health officer.
Allentown	*J. Treichler Butz, D. D. S., M. D.	Do.
Altoona	*T. G. Herbert	Chief, bureau of health.
Ambridge		
Beaver Falls	*Nelson W. Osmond	Health officer and plumbing inspector.
Berwick		
Bethlehem		
Braddock	*Jas. E. Wills	Health officer.
Bradford	*Carl Peterson	Do.
Bristol	John M. Wright	Do.
Butler	*J. Fred Leetch	Do.
Canonsburg		
Carbondale	*P. J. Sheare	Do.
Carlisle	*John L. Glass	Do.
Carnegie	*Joseph Lewis	Ordinance officer.
Chambersburg	*Frank J. Croft	City health officer and secretary.
Charleroi	*W. M. Darby	Health inspector.
Chester	*Mark G. Murtaugh	Health officer and secretary.
Clairton	*F. F. Keller	Health officer.
Coatesville		
Columbia	G. M. Rodenhauser	Secretary, board of health.
Connellsville	D. H. Minerd	Health officer.
Dickson City		
Donora	*Herman Lang	Do.
Du Bois	J. I. Brockbank, M. D	Do.
Dunmore	William Fenese	Do.
Duquesne		
Easton	J. A. Stotz, M. D	Do.
Ellwood City	*Louis Young	Do.
Erie	J. R. Smith, M. D	Do.
Farrell	*Harry Schmidt	Do.
Franklin	C. H. Brown, M. D	City health officer.
Greensburg	*T. Ray Hunter	Health officer.
Harrisburg	John M. J. Raunick, M. D	Health officer and director.
Hazleton	*William H. Pfaff	Health officer.
Homestead	W. E. Lawson, M. D	President, board of health.
Jeannette	*Charles Walter	Chief health officer.
Johnstown	L. W. Jones, M. D	Health officer.
Kingston	*J. F. Seward	Health officer and secretary, board of health.
Lancaster	*Benj. F. Charles	Health officer.
Lansford		
Latrobe	W. T. Osborne	Do.
Lebanon		
Lewistown	*H. E. Fetterolf	Do.
McKees Rocks		
McKeesport	*Daniel F. Marsh	Do.
Mahanoy City	*J. B. Kleindienst	Do.
Meadville	*John Laley	Do.
Monessen	*Francis E. Gibson	City health officer.
Mount Carmel	W. F. Stine	Health officer.
Nanticoke	*Daniel F. Sakowski	City health officer.
New Castle	William L. Steen, M. D	Health officer.
New Kensington	A. L. Davis	Do.
Norristown	*R. Ronald Dettre	Do.
North Braddock	*Michael J. Pastor	Do.
Oil City	*William J. Lewis	Do.
Old Forge	Peter Janosky	Do.
Olyphant	*Ignatious Zewan	Do.
Philadelphia	*A. A. Cairns, M. D., Dr. P. H.	Director department of public health.
	*Michael C. Goglia	Assistant director department of public health.
Bureau of health	*William J. Wolf	Secretary.
Bureau of hospitals	*William G. McAllister	Chief.
Philadelphia General Hospital, Thirty-Fourth and Pine Streets.		
Philadelphia Hospital for Contagious Diseases, Second and Luzerne Streets.		
Philadelphia Hospital for Mental Diseases, Byberry.		

City	Name of health officer	Official title
Pennsylvania—Continued.		
Phoenixville	*Russell E. Deery	Health officer.
Pittsburgh	*Charles B. Maits, M. D	Director department of public health.
Bureau of infectious diseases (including municipal and tuberculosis hospitals).	*P. E. Marks, M. D	Superintendent.
Bureau of sanitation	*Charles Parkinson	Do.
Bureau of child welfare.	*H. J. Benz, M. D	Do.
Bureau of food inspection.	*J. C. McNeil, V. M. D	Do.
Bureau of smoke regulation.	*H. B. Meller, C. E	Do.
Pittston	*Michael A. McHale	Health officer.
Plymouth	H. G. Templeton, M. D	Do.
Pottstown	*A. John André	Do.
Pottsville	*Chas. A. Heiser	Do.
Punxsutawney	J. Frank Boney	Do.
Reading	*Ira J. Hain, M. D	Do.
Scranton	Frank G. Bryant, M. D	Director, department of health.
Shamokin		
Sharon	*L. C. Brainard	Sanitary officer.
Shenandoah	*Joseph Mcluskey	Health officer.
Steelton	*E. G. Butler	Do.
Sunbury	*Victor A. Koble	Do.
Swissvale	*Samuel L. Glasgow	Do.
Tamaqua	Lamont Perrine	Do.
Taylor	E. E. Edwards, M. D	Do.
Tyrone	A. D. Mencer	Do.
Uniontown	*W. C. Hall	Do.
Vandergrift	Thos. J. Wyatt	Do.
Warren	*R. N. Brown	Do.
Washington	*Thos. W. Henderson	Do.
Waynesboro	*Percy H. Snowberger	Do.
West Chester	Enoch P. Hershey	Do.
Wilkes-Barre		
Wilkinsburg	*J. M. Snyder	Do.
Williamsburg	E. T. Clark	Do.
Williamsport	Robert F. Trainer, M. D	Do.
Windber	S. W. McMullen	Chief of police.
York	J. Frank Small, M. D	Director of public health.
Rhode Island:		
Bristol		
Central Falls	Adolph R. V. Fenwick, M. D	Superintendent of health.
Cranston	Daniel S. Latham, M. D	Do.
Cumberland		
East Providence		
Newport	Edward V. Murphy, M. D	Commissioner of health.
Pawtucket	Florian A. Ruest, M. D	Superintendent of health.
Providence	*Charles Value Chapin, M. D	Superintendent of health and city registrar.
Warwick		
West Warwick	Daniel S. Harrop, M. D	Health officer.
Westerly	Samuel C. Webster, Ph. G., M. D.	Superintendent of health.
Woonsocket	Thomas S. Flynn, M. D	Health officer.
South Carolina:		
Anderson	*E. R. Van De Grift, D. V. M	Commissioner of health.
Charleston	*Leon Banov, M. D	City-county health officer.
Columbia	Paul Eugene Payne	Health officer.
Florence	*George D. Heath, M. D., Dr. P. H.	Health commissioner.
Greenville	*Irving S. Barksdale, M. D	Commissioner of health.
Spartanburg		
Sumter	*J. R. Sumter	Health officer.
South Dakota:		
Aberdeen	M. C. Johnston, M. D	City and county health officer.
Sioux Falls	Wm. E. Donahoe, M. D	Health officer.
Watertown	George H. Richards, M. D	City health officer.
Tennessee:		
Chattanooga	*Fred C. McIsaac, M. D	Director of health.
Jackson	Hermon Hawkins, M. D	City physician.
Johnson City	*S. S. Moody, M. D	City health officer.
Knoxville	*W. H. Enneis, M. D	Do.
Memphis	*L. M. Graves, M. D	Superintendent of health department.
Nashville	*John Overton, M. D	Health officer.
Texas:		
Abilene	Scott W. Hollis, M. D	City and county health officer.
Amarillo	*H. H. Latson, M. D	City health officer.
Austin	*Lee E. Edens, M. D	Director of public health and welfare.
Beaumont	Dru McMickin, M. D	City health officer.
Brownsville	Harry Kalman Loew, M. D	Do.
Cleburne	M. T. Knox, M. D	Do.

City	Name of health officer	Official title
Texas—Continued.		
Corpus Christi		City health officer.
Corsicana		Do.
Dallas	*Lane B. Cooke, M. D	Director of public health.
Del Rio	B. F. Orr, M. D	City health officer.
Denison	A. G. Sneed, M. D	Do.
Eastland	E. R. Townsend, M. D	Do.
El Paso	*P. R. Outlaw, M. D	Do.
Fort Worth	*Arthur Heath Flickwir, surgeon, U. S. P. H. S.	Director of public health and welfare.
Galveston	Walter Kleberg, M. D	City health officer.
Houston	*Allen C. Hutcheson, M. D	Do.
Laredo		
Marshall	Galen Eads, M. D	City physician.
Orange	J. E. Reeves, M. D	Health officer.
Palestine	J. M. Colley, M. D	City health officer.
Paris	D. S. Hammond, M. D	Do.
Port Arthur	A. S. Pollock, M. D	Do.
Ranger	Walter C. Palmer, M. D	Do.
San Angelo	A. C. De Long, M. D	Do.
San Antonio	*William A. King, M. D	Do.
San Benito	*W. E. Spivey, M. D	Director county health unit.
Sherman	A. L. Ridings, M. D	City health officer.
Temple	Benjamin F. Lee, M. D	Do.
Texarkana		
Tyler	Albert Woldert, Ph. G., M. D	Do.
Waco	T. E. Tabb, M. D	Do.
Wichita Falls	*Hartson D. Fillmore, M. D	City physician.
Utah:		
Logan		
Ogden	N. Henry Savage, M. D	Do.
Provo	John L. Aird, M. D	Do.
Salt Lake City	W. Christopherson, Ph. G., M. D.	Health commissioner.
Vermont:		
Barre	Marshal Dana Lamb, M. D	City health officer.
Bennington		
Burlington	Erald F. Foster, M. D	Health officer.
Rutland	*Clare M. Cole	Do.
Virginia:		
Alexandria	*W. Lewis Schafer, M. D	Health officer and clinician.
Charlottesville	*George B. Young, M. D	Health officer.
Danville	*R. N. Garnett, M. D	City health officer.
Lynchburg	*Mosby G. Perrow, Ph. D	Director of public welfare.
Newport News	*G. Colbert Tyler, M. D	Health officer.
Norfolk	*Powhatan S. Schenck, M. D	Health commissioner.
Petersburg		
Portsmouth	*Lonsdale J. Roper, M. D	Director of public welfare.
Richmond	*W. Brownley Foster, M. D	Director of public welfare and health officer.
Roanoke	*Coleman Bernard Ransone, M. D.	Health officer.
Staunton	*J. F. Fulton, M. D	Do.
Suffolk	*Challis H. Dawson, M. D	Director of health.
Washington:		
Aberdeen	B. O. Swinehart, M. D	City health officer.
Bellingham	Isaac W. Powell, M. D	Do.
Bremerton	P. I. Sanders, M. D	Do.
Everett	C. W. Stomberg, M. D	Do.
Hoquiam	E. L. Calhoun, M. D	Do.
Seattle	*E. T. Hanley, M. D	Commissioner of health.
Spokane	Ralph Hendricks, M. D	Commissioner of public affairs and health officer.
Tacoma	*Herman S. Judd, M. D	Director of health.
Vancouver	*Geo. H. T. Sparling, M. D	Health officer and field agent, United States Public Health Service.
Walla Walla	*Jerry E. Vanderpool, M. D	County and city health officer.
Yakima	*Lloyd Moffitt, M. D	Do.
West Virginia:		
Bluefield	*David B. Lepper, M. D., C. P. H.	Director of health.
Charleston	Hugh B. Robins, M. D	Health officer.
Clarksburg	*Benjamin F. Matheny, M. D	City physician.
Fairmont	*J. A. Jamison, M. D	City health officer.
Huntington	L. T. Vinson, M. D	Do.
Martinsburg	*W. Ross Cameron, M. D.	City and county health officer.
Morgantown	*Harry H. Pierce, M. D., C. M.	City health officer.
Moundsville	C. E. Hutchinson, M. D	City and county health officer.
Parkersburg	*Arthur D. Knott, M. D., Dr. P. H.	Do.
Wheeling	*William Hay McLain, M. D	City-county health commissioner.
Wisconsin:		
Appleton	Frank P. Dohearty, M. D	Health officer.
Ashland		
Beloit	*Clifford W. Andrews, M. D	Do.
Eau Clair	L. H. Flynn, M. D	Do.
Fond du Lac	*G. B. McKnight, M. D	Health commissioner.

City	Name of health officer	Official title
Wisconsin—Continued.		
Green Bay	Henry S. Atkinson, M. D.	City physician and health commissioner.
Janesville	Fred B. Welch, M. D.	City health officer.
Kenosha	*G. Windesheim, M. D.	Director of health.
La Crosse	*Anthony M. Murphy	Health officer.
Madison	*F. F. Bowman, B. L., M. D.	Do.
Manitowoc	W. G. Kemper, M. D.	Commissioner of health.
Marinette	J. Wm. Boren, M. D.	Do.
Milwaukee	*John P. Koehler, M. D.	Do.
	E. V. Brumbaugh, M. D.	Deputy health officer.
School hygiene division.	George P. Barth, M. D.	Director.
Division of venereal diseases.	William J. McKillip, M. D.	Do.
Vital statistics	George E. Adams	Deputy registrar.
Division of tuberculosis.	George R. Ernst, M. D.	Director.
Contagious disease division.	M. R. French, M. D.	Do.
Division of food and sanitary inspection.	Stanley Pilgrim, M. D.	Do.
Bureau of laboratories.	R. W. Cunliffe	Do.
Division of child welfare.	E. V. Brumbaugh, M. D.	Do.
Division of nurses	Alma Brunk, R. N.	Do.
Oshkosh	*Edward Joseph Campbell, M. D.	Health commissioner.
Racine	*W. W. Bauer, M. D.	Health officer.
Sheboygan	*Gustav J. Hildebrand, M. D.	Commissioner of public health.
Stevens Point	F. R. Krembs, M. D.	Health officer.
Superior	*Geo. Hall Conklin, M. D.	Health commissioner.
Waukesha	Frank M. Scheele, M. D.	Do.
Wausau	*L. F. Bugbee	Health officer.
West Allis	*Samuel C. McCorkle, M. D.	Health commissioner.
Wyoming:		
Casper	H. R. Lathrop, M. D.	County and city health officer.
Cheyenne	N. C. Nelson, M. D.	Do.

DEATHS DURING WEEK ENDED OCTOBER 25, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended October 25, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Oct. 25, 1930	Corresponding week, 1929
Policies in force	75, 394, 853	74, 968, 195
Number of death claims	13, 092	13, 305
Death claims per 1,000 policies in force, annual rate	9. 1	9. 3

Deaths [1] from all causes in certain large cities of the United States during the week ended October 25, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Oct. 25, 1930				Corresponding week, 1929		Death rate [2] for first 43 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (78 cities)	7, 383	11. 1	726	[4] 59	11. 8	733	12. 0	12. 7
Akron	38	7. 8	8	74	8. 7	6	8. 0	9. 4
Albany [5]	25	10. 2	2	41	15. 7	4	14. 7	16. 4
Atlanta	86	16. 7	10	102	9. 3	1	15. 9	16. 1
White	51		6	95		1		
Colored	35	([6])	4	115		0	([6])	([6])

See footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended October 25, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929*—Continued

City	Week ended Oct. 25, 1930				Corresponding week, 1929		Death rate [2] for first 43 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Baltimore [5]	199	12.9	21	73	13.4	18	14.0	14.7
White	125		14	62		11		
Colored	74	(6)	7	112	(6)	7	(6)	(6)
Birmingham	49	9.8	4	38	14.3	12	13.7	16.1
White	21		0	0		8		
Colored	28	(6)	4	98	(6)	4	(6)	(6)
Boston	201	13.4	28	81	12.8	26	14.1	15.1
Bridgeport	26	9.2	1	17	9.6	3	11.0	12.2
Buffalo	116	10.5	10	45	13.5	10	13.0	14.1
Cambridge	25	11.5	2	40	12.0	1	11.9	12.6
Camden	23	10.2	3	53	16.0	8	13.5	14.6
Canton	25	12.3	3	80	13.0	2	10.0	11.4
Chicago [5]	569	8.7	53	47	10.3	50	10.4	11.3
Cincinnati	124	14.4	16	94	16.4	17	15.6	17.2
Cleveland	150	8.7	17	51	10.4	14	11.1	12.5
Columbus	68	12.2	12	118	16.6	13	15.6	14.9
Dallas	59	11.7	2		8.0	5	11.3	11.5
White	43		1			5		
Colored	16	(6)	1		(6)	0	(6)	(6)
Dayton	40	10.4	4	60	9.0	6	10.8	11.6
Denver	73	13.2	6	65	13.7	8	14.8	14.9
Des Moines	29	10.6	3	55	10.3	0	11.7	11.7
Detroit	268	8.8	43	66	10.6	39	9.3	11.3
Duluth	26	13.4	3	81	11.9	4	11.3	11.6
El Paso	22	11.2	6		13.0	6	17.3	19.8
Erie	32	14.4	2	44	6.8	2	11.2	12.4
Fall River [5] [7]	16	7.3	0	0	8.6	2	11.9	13.8
Flint	22	7.3	4	47	7.2	4	9.2	10.8
Fort Worth	37	11.9	3		8.9	4	11.1	12.3
White	31		3			4		
Colored	6	(6)	0		(6)	0	(6)	(6)
Grand Rapids	30	9.3	5	75	7.5	2	10.3	10.2
Houston	63	11.2	9		8.9	4	12.2	12.7
White	45		5			1		
Colored	18	(6)	4		(6)	3	(6)	(6)
Indianapolis	84	12.0	10	75	12.9	5	14.7	14.8
White	67		6	52		4		
Colored	17	(6)	4	233	(6)	1	(6)	(6)
Jersey City	78	12.9	10	87	12.9	7	11.3	12.6
Kansas City, Kans	23	9.8	4	93	7.3	0	11.7	13.1
White	20		4	110		0		
Colored	3	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo	98	13.0	8	67	12.8	6	13.5	14.0
Knoxville	23	11.3	0	0	15.1	3	13.7	14.0
White	19		0	0		3		
Colored	4	(6)	0	0	(6)	0	(6)	(6)
Los Angeles	246	10.3	18	54	10.0	17	11.0	11.4
Louisville	81	13.7	7	60	14.2	8	13.6	15.0
White	62		4	39		6		
Colored	19	(6)	3	199	(6)	2	(6)	(6)
Lowell [7]	27	14.0	3	79	13.4	2	13.5	14.2
Lynn	20	10.2	2	56	9.7	1	10.4	11.3
Memphis	70	14.4	11	129	17.1	12	17.1	19.1
White	35		5	90		7		
Colored	35	(6)	6	202	(6)	5	(6)	(6)
Milwaukee	118	10.8	14	61	9.8	9	9.8	11.0
Minneapolis	105	11.8	10	66	8.2	7	10.7	10.8
Nashville	36	12.8	11	173	17.8	6	17.4	18.9
White	20		4	84		3		
Colored	16	(6)	7	435	(6)	3	(6)	(6)
New Bedford [7]	21	9.7	1	26	8.3	1	10.9	12.1
New Haven	30	9.6	3	46	17.3	2	12.7	13.5
New Orleans	138	15.7	13	72	17.5	10	17.5	17.7
White	74		5	42		6		
Colored	64	(6)	8	130	(6)	4	(6)	(6)
New York	1,380	10.3	120	50	11.4	142	10.7	11.4
Bronx Borough	166	6.8	14	41	8.7	20	7.8	8.8
Brooklyn Borough	495	9.9	52	55	10.3	57	9.7	10.3
Manhattan Borough	529	14.9	40	51	16.7	53	16.1	16.5
Queens Borough	151	7.2	11	44	6.9	9	7.1	7.6
Richmond Borough	39	12.9	3	58	14.9	3	14.4	16.0

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended October 25, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929—Continued

City	Week ended Oct. 25, 1930				Corresponding week, 1929		Death rate [2] for first 43 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Newark, N. J	101	11.8	13	68	11.0	11	12.0	12.8
Oakland	61	11.1	2	25	9.9	1	10.9	11.4
Oklahoma City	38	10.7	3	54	11.5	4	10.9	10.8
Omaha	55	13.4	4	49	14.2	6	13.5	13.7
Paterson	34	12.8	3	52	11.3	5	12.2	13.3
Philadelphia	455	12.1	34	51	12.4	38	12.5	13.2
Pittsburgh	160	12.4	23	82	13.2	23	13.8	14.8
Portland, Oreg	78	13.6	7	87	12.0	4	12.2	12.7
Providence	49	10.2	1	9	13.3	2	13.0	14.6
Richmond	44	12.5	4	58	11.5	7	14.7	16.3
White	24		0	0		6		
Colored	20	(6)	4	171	(6)	1	(6)	(6)
Rochester	62	9.9	8	71	12.3	5	11.6	12.4
St. Louis	217	13.7	16	56	15.8	30	14.1	14.7
St. Paul	54	10.4	4	40	9.7	6	10.1	10.5
Salt Lake City [5]	46	17.1	5	79	13.6	3	12.3	13.0
San Antonio	51	10.4	7		14.3	5	14.8	14.5
San Diego	47	16.4	2	42	12.0	2	14.4	15.2
San Francisco	151	12.5	7	47	12.2	7	13.1	13.0
Schenectady	14	7.6	0	0	10.4	2	11.2	12.3
Seattle	71	10.2	7	71	10.6	1	10.9	11.2
Somerville	18	9.0	4	126	7.6	1	9.8	9.2
Spokane	34	15.3	4	101	12.7	2	12.4	12.8
Springfield, Mass	31	10.8	1	17	13.0	7	12.2	12.9
Syracuse	54	13.6	5	62	12.7	8	11.8	13.2
Tacoma	34	16.6	2	55	13.7	1	12.4	11.9
Toledo	62	11.1	6	55	16.3	14	12.7	13.7
Trenton	38	16.1	4	77	16.6	5	16.8	17.1
Utica	33	16.7	2	56	12.2	1	14.7	15.7
Washington, D. C	135	14.5	12	70	14.6	5	15.1	15.4
White	78		1	9		2		
Colored	57	(6)	11	196	(6)	3	(6)	(6)
Waterbury	14	7.2	2	49	8.3	3	9.4	9.5
Wilmington, Del.[7]	28	13.9	2	48	14.9	5	14.6	14.0
Worcester	42	11.1	2	28	9.9	2	12.6	12.6
Yonkers	22	8.4	1	24	9.4	4	8.0	9.3
Youngstown	31	9.5	4	57	12.2	4	10.2	12.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 73 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

[7] Population, Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended November 1, 1930, and November 2, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 1, 1930, and November 2, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929
New England States:								
Maine	4	8	6		3	29	0	0
New Hampshire	2	2				6	0	0
Vermont	1	3			6		0	0
Massachusetts	76	95	2	3	93	51	0	1
Rhode Island	11	14		29			0	0
Connecticut	17	19	3	5	47	2	0	1
Middle Atlantic States:								
New York	78	114	[1] 7	[1] 16	93	183	11	11
New Jersey	66	126	6	6	48	28	1	6
Pennsylvania	100	232			126	262	5	5
East North Central States:								
Ohio	114	106	18	16	24	198	6	6
Indiana	36	32	7		24	6	2	1
Illinois	175	226	11	17	31	103	6	12
Michigan	68	96		4	54	103	6	10
Wisconsin	29	19	11	20	320	163	2	0
West North Central States:								
Minnesota	18	25		2	8	33	1	1
Iowa	10	15			1	22	0	0
Missouri	47	41		2	153	16	5	5
North Dakota	24	11			15	9	1	0
South Dakota	5					1	0	0
Nebraska	12	32		4	15	7	0	0
Kansas	1	55		1	40	50	23	0
South Atlantic States:								
Delaware	2	1		3	1	1	0	0
Maryland [2]	34	19	11	13	4	12	1	0
District of Columbia	4	12			3	2	2	0
Virginia								
West Virginia	34	34	29	12	23	28	0	0
North Carolina	167	268	11	4	5	1	0	1
South Carolina	60	68	449	506			0	0
Georgia	39	24	68	85	6	2	1	2
Florida	33	16	3	2	7	1	0	0
East South Central States:								
Kentucky	35	31			47		2	4
Tennessee	45	81	31	40	9	39	1	4
Alabama	114	72	19	85	21	7	4	0
Mississippi	72	68					1	0

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 1, 1930, and November 2, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929
West South Central States:								
Arkansas	18	20	44	27	1	1	0	0
Louisiana	26	47	6	4	3	-	1	0
Oklahoma [3]	56	137	27	47	10	17	1	0
Texas	42	111	14	19	13	5	1	0
Mountain States:								
Montana	-	2	-	1	3	147	0	3
Idaho	-	1	-	-	4	9	0	3
Wyoming	-	-	2	-	-	1	0	3
Colorado	8	11	-	-	29	4	0	0
New Mexico	9	13	2	-	8	2	2	0
Arizona	13	32	1	6	30	3	1	9
Utah [2]	-	-	3	-	1	25	2	4
Pacific States:								
Washington	33	26	3	-	8	28	2	2
Oregon	2	8	29	17	31	10	0	2
California	50	55	30	24	131	59	1	3

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929
New England States:								
Maine	11	1	19	31	0	0	6	3
New Hampshire	1	0	4	11	0	0	1	0
Vermont	2	0	3	6	0	5	0	0
Massachusetts	33	4	128	156	0	0	5	7
Rhode Island	0	0	7	12	0	0	4	0
Connecticut	4	0	18	36	0	0	2	0
Middle Atlantic States:								
New York	18	14	210	192	0	20	29	33
New Jersey	1	2	107	86	0	0	12	9
Pennsylvania	5	12	261	250	0	7	64	42
East North Central States:								
Ohio	98	9	460	225	15	86	50	34
Indiana	13	0	173	115	14	101	22	6
Illinois	17	3	301	333	27	104	16	20
Michigan	18	2	129	199	13	81	18	11
Wisconsin	13	0	90	88	1	18	15	15
West North Central States:								
Minnesota	45	1	33	103	2	2	5	7
Iowa	12	6	41	49	11	40	8	2
Missouri	9	2	77	53	15	3	17	7
North Dakota	3	0	17	24	25	8	6	1
South Dakota	9	0	5	13	20	8	3	11
Nebraska	12	1	25	31	12	9	5	1
Kansas	79	3	5	86	0	11	3	5
South Atlantic States:								
Delaware	0	0	12	4	0	0	4	1
Maryland [2]	3	0	48	53	0	0	31	18
District of Columbia	0	0	9	5	0	0	3	0
Virginia	-	5	-	-	-	45	-	-
West Virginia	3	0	36	75	16	9	38	22
North Carolina	0	3	148	142	4	8	13	15
South Carolina	3	2	38	41	2	0	28	20
Georgia	0	0	45	40	0	0	14	4
Florida	0	0	5	14	0	0	3	2
East South Central States:								
Kentucky	1	0	90	71	0	-	22	8
Tennessee	1	1	34	79	3	0	24	27
Alabama	8	0	85	77	0	1	17	12
Mississippi	0	0	36	22	0	0	23	10
West South Central States:								
Arkansas	5	0	23	26	2	2	44	22
Louisiana	1	0	12	24	0	0	28	13
Oklahoma [3]	1	0	36	64	11	36	43	41
Texas	4	0	14	28	4	3	9	14

[2] Week ended Friday.

[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 1, 1930, and November 2, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929	Week ended Nov. 1, 1930	Week ended Nov. 2, 1929
Mountain States:								
Montana	2	0	16	30	1	3	6	9
Idaho	1	0	9	13	0	6	1	0
Wyoming	1	0	2	4	0	10	1	0
Colorado	3	0	38	16	5	3	7	1
New Mexico	0	1	2	3	0	2	10	4
Arizona	0	1	3	17	3	7	7	13
Utah [1]	0	0	3	4	0	0	0	3
Pacific States:								
Washington	2	3	31	46	29	15	16	12
Oregon	1	2	16	27	0	3	1	4
California	61	1	73	200	16	17	13	13

[1] Week ended Friday.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Cerebrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September, 1930										
Arkansas	2	21	10	261	1	141	16	43	5	133
Montana	2	6			5		3	57		39
Nevada							2			1
Virginia	4	156	392	111	92	53	18	186	9	213
Wisconsin	5	28	71		104		47	153	20	32
October, 1930										
Georgia	1	111	138	459	43	42	7	126	1	130

September, 1930

	Cases
Chicken pox:	
Arkansas	15
Montana	28
Nevada	4
Virginia	74
Wisconsin	134
Diarrhea and dysentery:	
Virginia	848
Dysentery:	
Montana	15
Hookworm disease:	
Arkansas	13
Lethargic encephalitis:	
Wisconsin	3
Mumps: [1]	
Arkansas	23
Montana	12
Wisconsin	118
Ophthalmia neonatorum:	
Arkansas	1
Paratyphoid fever:	
Arkansas	1
Septic sore throat:	
Montana	4
Trachoma:	
Arkansas	2
Montana	8
Tularæmia:	
Nevada	1
Virginia	1
Typhus fever:	
Virginia	1
Undulant fever:	
Wisconsin	2
Whooping cough: [1]	
Arkansas	45
Montana	51
Nevada	7
Virginia	204
Wisconsin	548

October, 1930

	Cases
Georgia:	
Chicken pox	7
Dengue	4
Dysentery	22
Hookworm disease	38
Mumps	9
Paratyphoid fever	2
Septic sore throat	19
Typhus fever	24
Whooping cough	45

[1] Cases of mumps and whooping cough reported for Iowa in Public Health Reports for November 7, 1930, pp. 2764 and 2765, should have been for Idaho.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,130,000. The estimated population of the 91 cities reporting deaths is more than 30,570,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended October 25, 1930, and October 26, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,674	2,428	
97 cities	485	810	1,022
Measles:			
45 States	938	1,511	
97 cities	230	181	
Meningococcus meningitis:			
46 States	68	103	
97 cities	36	35	
Poliomyelitis: 46 States	397	104	
Scarlet fever:			
46 States	2,510	2,881	
97 cities	760	833	803
Smallpox:			
46 States	219	436	
97 cities	15	62	15
Typhoid fever:			
46 States	741	497	
97 cities	109	92	93
Deaths reported			
Influenza and pneumonia: 91 cities	551	675	
Smallpox: 91 cities	0	0	

City reports for week ended October 25, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and City	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	1	0		0	0	0	1
New Hampshire:								
Concord	0	0	0		0	0	0	0
Nashua	1	1	1		0	0	0	0

City reports for week ended October 25, 1930—Continued

Division, State, and City	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND—con.								
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	1	0		0	0	0	0
Massachusetts:								
Boston	31	28	22		1	23	3	21
Fall River	1	3	2		0	0	0	1
Springfield	26	4	2		0	0	0	2
Worcester	7	5	11	1	0	0	0	3
Rhode Island:								
Pawtucket	0	1	0		0	0	0	2
Providence	11	8	4		0	0	0	2
Connecticut:								
Bridgeport	1	4	0		0	1	0	0
Hartford	6	5	2		0	2	0	3
New Haven	0	1	1		0	5	0	6
MIDDLE ATLANTIC								
New York:								
Buffalo	15	14	6		0	8	2	11
New York	49	132	35	4	10	38	23	135
Rochester	14	5	0		0	1	0	0
Syracuse	10	4	0		0	0	1	4
New Jersey:								
Camden	1	8	1		0	2	4	2
Newark	13	13	14	6	1	3	6	7
Trenton	3	2	1		0	0	0	1
Pennsylvania:								
Philadelphia	50	56	9	1	3	6	10	36
Pittsburgh	4	25	9		0	5	4	28
Reading	9	2	0		0	0	4	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	1	11	2	1	1	2	4	5
Cleveland	53	52	15	3	0	4	26	14
Columbus	28	5	1		0	1	0	4
Toledo	36	9	9		0	2	3	1
Indiana:								
Fort Wayne	3	5	3		0	0	0	3
Indianapolis	11	14	3		0	2	3	9
South Bend	5	2	1		0	0	0	3
Terre Haute	0	2	1		0	0	0	3
Illinois:								
Chicago	86	118	97	4	3	3	33	25
Springfield	0	0	2		0	0	0	0
Michigan:								
Detroit	60	66	37		1	4	6	10
Flint	8	6	0		0	4	2	2
Grand Rapids	2	3	0		0	0	1	1
Wisconsin:								
Kenosha	41	1	1		0	0	2	1
Madison	4	2	0			0	10	
Milwaukee	49	18	6		0	5	9	3
Racine	10	2	0		0	0	1	1
Superior	1	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	18	2	0		0	0	0	1
Minneapolis	42	33	2		1	3	15	3
St. Paul	20	13	0		0	0	2	5
Iowa:								
Davenport	3	1	1			0	1	
Des Moines	1	4	0			0	0	
Sioux City	3	2	5			0	3	
Waterloo	0	1	0			0	0	
Missouri:								
Kansas City	19	11	7		1	2	0	3
St. Joseph	1	2	0		0	1	0	1
St. Louis	11	43	14	1	1	66	3	

City reports for week ended October 25, 1930—Continued

Division, State, and City	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
WEST NORTH CENTRAL—con.								
North Dakota:								
Fargo	14	0	0		0	0	6	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Sioux Falls	0	1	0			0	0	
Nebraska:								
Omaha	1	14	4		0	1	1	5
Kansas:								
Topeka	1	3	2	2	0	1	1	0
Wichita	0	4	0		0	0	0	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	3	0		0	0	0	0
Maryland:								
Baltimore	12	24	9	7	0	0	2	19
Cumberland	0	1	0		0	0	0	0
Frederick	0	0	0		0	0	0	0
District of Columbia:								
Washington	1	18	7	1	0	2	0	22
Virginia:								
Lynchburg	0	4	0		0	0	0	0
Norfolk	0	3	2		0	0	0	0
Richmond	1	22	10		1	2	0	0
Roanoke	1	7	4		0	0	0	0
West Virginia:								
Charleston	1	2	2		0	0	0	0
Wheeling	0	1	0		0	0	0	0
North Carolina:								
Raleigh	0	4	4		0	0	0	0
Wilmington	0	1	3		0	0	0	0
Winston-Salem	1	7	4	2	0	2	0	0
South Carolina:								
Charleston	0	1	0	29	0	0	0	0
Columbia	0	2	3		0	0	0	0
Greenville	0	2	1		0	0	0	0
Georgia:								
Atlanta	0	10	2	15	0	1	0	0
Brunswick	0	1	0		1	0	0	0
Savannah	0	2	4	5	0	0	0	0
Florida:								
Miami	0	2	1		0	1	1	0
Tampa	0	3	1		0	0	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	2	0		0	0	0	0
Tennessee:								
Memphis	8	10	12		0	0	0	0
Nashville	0	3	3		0	1	0	0
Alabama:								
Birmingham	0	7	9	2	0	3	0	0
Mobile	0	2	2	1	1	0	0	0
Montgomery	0	3	4			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith		1						
Little Rock	0	1	0		0	0	0	1
Louisiana:								
New Orleans	0	12	4	1	0	0	0	12
Shreveport	0	2	0		0	0	0	0
Oklahoma:								
Muskogee	0	6	0		0	0	0	0
Oklahoma City	0	5	5		0	0	0	9
Tulsa	1	5	9			0	2	
Texas:								
Dallas	0	18	6		1	0	2	7
Fort Worth	23	6	6		0	0	0	0
Galveston	0	2	1		0	0	0	5
Houston	0	7	8		0	1	0	4
San Antonio	0	3	4		1	0	0	6

City reports for week ended October 25, 1930—Continued

Division, State, and City	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MOUNTAIN								
Montana:								
Billings	3	0	0		0	0	0	0
Great Falls	6	0	0		0	1	0	0
Helena	0	0	0		0	0	0	0
Missoula	19	1	0		0	0	0	0
Idaho:								
Boise	1	0	0		0	1	0	0
Colorado:								
Denver	17	12	7		1	2	5	6
Pueblo	1	1	0		0	10	0	0
New Mexico:								
Albuquerque	0	0	1		0	0	0	3
Arizona:								
Phoenix	0	0	0		1	0	0	2
Utah:								
Salt Lake City	9	4	0		0	2	3	3
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	24	5	13		1	3	0	2
Spokane	6	3	0			0	0	
Tacoma	8	4	7		0	0	0	3
Oregon:								
Salem	1	0	1		0	0	0	0
California:								
Los Angeles	18	37	25	11	1	6	8	13
Sacramento	3	2	2	1	1	0	5	3
San Francisco	15	14	3	2	0	0	7	3

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	2	9	0	0	0	0	0	1	0	7	22
New Hampshire:											
Concord	1	3	0	0	0	0	0	1	0	0	8
Nashua	0	1	0	0	0	0	0	0	0	0	
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	3	6
Burlington	0	0	0	0	0	0	0	0	0	0	12
Massachusetts:											
Boston	41	22	0	0	0	11	2	3	0	14	201
Fall River	3	1	0	0	0	1	0	2	0	0	16
Springfield	5	3	0	0	0	0	0	0	0	0	26
Worcester	8	17	0	0	0	0	0	0	0	4	42
Rhode Island:											
Pawtucket	1	3	0	0	0	0	0	0	0	5	11
Providence	5	4	0	0	0	7	1	2	0	9	49
Connecticut:											
Bridgeport	5	0	0	0	0	2	0	2	0	0	26
Hartford	3	1	0	0	0	1	0	1	0	3	31
New Haven	3	2	0	0	0	0	1	0	0	0	30
MIDDLE ATLANTIC											
New York:											
Buffalo	17	8	0	1	0	4	1	0	0	14	105
New York	68	46	0	0	0	84	19	14	2	110	1,380
Rochester	3	18	0	0	0	1	1	4	0	6	58
Syracuse	5	4	0	0	0	1	0	0	0	0	54

City reports for week ended October 25, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
MIDDLE ATLANTIC—continued											
New Jersey:											
Camden	3	2	0	0	0	1	0	0	0	5	23
Newark	9	4	0	0	0	7	2	0	0	27	104
Trenton	1	6	0	0	0	3	1	3	0	1	38
Pennsylvania:											
Philadelphia	50	64	0	0	0	22	8	5	0	24	455
Pittsburgh	31	19	0	0	0	7	1	1	1	1	160
Reading	1	1	0	0	0	1	0	0	0	0	23
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	11	14	0	2	0	8	0	0	0	0	124
Cleveland	22	39	0	0	0	8	1	0	1	7	150
Columbus	9	8	0	0	0	2	0	2	1	1	68
Toledo	10	8	1	0	0	5	1	0	0	1	62
Indiana:											
Fort Wayne	1	0	0	0	0	2	0	1	0	0	24
Indianapolis	11	20	1	0	0	7	0	0	0	7	--------
South Bend	3	2	0	0	0	0	0	0	0	0	16
Terre Haute	2	2	0	0	0	0	1	0	0	0	21
Illinois:											
Chicago	71	92	0	1	0	30	4	2	0	52	569
Springfield	2	0	0	0	0	1	0	0	0	6	26
Michigan:											
Detroit	61	49	1	0	0	21	3	1	0	45	268
Flint	10	10	1	0	0	1	0	1	0	0	22
Grand Rapids	7	8	0	0	0	1	0	0	1	2	30
Wisconsin:											
Kenosha	2	2	0	0	0	0	1	1	0	0	4
Madison	1	1	1	0	--------	--------	0	0	--------	5	--------
Milwaukee	18	6	0	0	0	3	0	0	0	26	118
Racine	3	11	0	0	0	1	0	0	0	12	14
Superior	3	2	0	0	0	0	0	0	0	1	7
WEST NORTH CENTRAL											
Minnesota:											
Duluth	8	3	1	0	0	0	0	0	0	6	26
Minneapolis	40	3	0	0	0	1	0	0	0	5	105
St. Paul	18	10	1	0	0	4	1	0	0	0	59
Iowa:											
Davenport	0	0	0	1	--------	--------	0	1	--------	0	--------
Des Moines	9	6	0	0	--------	--------	0	0	--------	0	29
Sioux City	2	6	0	0	--------	--------	0	0	--------	1	1
Waterloo	2	0	0	0	--------	--------	0	0	--------	0	--------
Missouri:											
Kansas City	12	9	0	0	0	10	1	2	1	1	98
St. Joseph	3	3	1	0	0	0	0	0	0	0	24
St. Louis	31	12	1	0	0	8	4	2	0	2	217
North Dakota:											
Fargo	2	3	0	0	0	0	0	0	0	6	12
Grand Forks	2	0	1	1	--------	--------	0	0	--------	0	--------
South Dakota:											
Sioux Falls	2	0	1	1	--------	--------	0	0	--------	0	8
Nebraska:											
Omaha	4	7	1	0	0	1	0	0	0	0	55
Kansas:											
Topeka	5	1	0	0	0	1	1	0	0	0	10
Wichita	5	3	1	0	0	1	0	0	0	0	28
SOUTH ATLANTIC											
Delaware:											
Wilmington	4	1	0	0	0	0	0	0	0	0	28
Maryland:											
Baltimore	13	16	0	0	0	15	6	12	1	13	199
Cumberland	0	1	0	0	0	0	0	1	0	0	9
Frederick	1	0	0	0	0	0	0	0	0	0	5
District of Columbia:											
Washington	15	18	0	0	0	4	2	2	0	13	135

City reports for week ended October 25, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC—continued											
Virginia:											
Lynchburg	2	1	0	0	0	1	1	2	0	2	9
Norfolk	2	3	0	0	0	0	0	0	0	0	-------
Richmond	10	11	0	0	0	3	1	0	1	1	51
Roanoke	4	2	0	0	0	0	1	0	0	0	15
West Virginia:											
Charleston	2	0	0	0	0	0	1	2	0	1	22
Wheeling	2	2	0	0	0	0	0	0	0	0	21
North Carolina:											
Raleigh	2	1	0	0	0	0	0	0	0	0	12
Wilmington	1	4	0	0	0	0	0	0	0	0	8
Winston-Salem	3	3	0	0	0	0	0	0	0	0	14
South Carolina:											
Charleston	1	0	0	0	0	1	1	1	0	0	26
Columbia	1	2	0	0	0	0	0	0	0	0	6
Greenville	0	4	0	0	0	0	0	0	0	0	-------
Georgia:											
Atlanta	8	19	0	0	0	6	1	0	0	0	86
Brunswick	0	0	0	0	0	1	0	0	0	0	5
Savannah	0	0	0	0	0	4	1	0	0	0	33
Florida:											
Miami	1	0	0	0	0	1	1	4	0	0	24
St. Petersburg	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Tampa	0	0	1	0	0	2	0	0	0	0	20
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	10	0	0	0	0	0	0	0	0	19
Tennessee:											
Memphis	5	6	0	0	0	2	3	9	0	5	70
Nashville	2	1	0	0	0	5	3	3	0	2	36
Alabama:											
Birmingham	5	5	0	0	0	3	1	2	1	2	49
Mobile	1	0	0	0	0	1	0	0	0	0	17
Montgomery	2	3	0	0	-------	-------	0	0	-------	2	-------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Little Rock	3	0	0	0	0	0	1	0	0	0	-------
Louisiana:											
New Orleans	5	9	0	0	0	9	3	4	0	6	138
Shreveport	1	0	0	0	0	0	0	0	0	0	23
Oklahoma:											
Muskogee	1	0	0	0	0	0	0	0	0	0	-------
Oklahoma City	2	12	0	0	0	2	0	2	0	0	38
Tulsa	2	3	0	0	-------	-------	0	0	-------	0	-------
Texas:											
Dallas	6	6	0	0	0	1	1	1	1	2	59
Fort Worth	1	2	0	0	0	2	0	0	0	0	36
Galveston	0	0	0	0	0	0	0	1	0	0	16
Houston	2	1	0	1	0	4	0	0	0	0	63
San Antonio	0	3	0	1	0	5	0	1	1	0	51
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	2	6
Great Falls	1	5	1	0	0	0	0	0	0	0	12
Helena	0	0	0	0	0	0	0	0	0	0	2
Missoula	0	0	0	0	0	0	1	0	0	0	1
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	0	3
Colorado:											
Denver	9	10	0	0	0	6	1	4	1	25	80
Pueblo	1	0	0	0	0	0	1	2	0	5	8
New Mexico:											
Albuquerque	1	0	0	0	0	5	0	1	0	0	11

City reports for week ended October 25, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
MOUNTAIN—con.											
Arizona:											
Phoenix	1	0	0	0	0	4	0	0	0	0	17
Utah:											
Salt Lake City	2	3	0	0	0	0	3	3	0	8	46
Nevada:											
Reno	0	1	0	0	0	0	0	0	0	0	6
PACIFIC											
Washington:											
Seattle	7	28	1	0	------	-----	1	3	------	8	71
Spokane	8	0	1	3	-----	-----	1	4	-----	0	------
Tacoma	4	3	2	4	0	0	0	0	0	0	34
Oregon:											
Salem	0	1	0	1	0	0	0	0	0	0	------
California:											
Los Angeles	20	8	0	2	0	23	2	1	0	14	246
Sacramento	2	1	0	0	0	3	1	0	0	4	30
San Francisco	10	4	0	0	0	16	1	0	0	0	133

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	7	2
Massachusetts:									
Boston	1	1	0	0	0	0	2	12	1
Fall River	1	0	0	0	0	0	0	0	0
Rhode Island:									
Providence	0	0	0	0	0	0	0	1	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	0	0	1	0	1	0	0
New York	4	4	1	1	0	0	11	2	0
Syracuse	0	0	0	0	0	0	0	4	0
New Jersey:									
Trenton	0	0	0	0	0	0	0	1	1
Pennsylvania:									
Philadelphia	3	1	0	0	0	0	2	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	0	0	0	0	4	0
Cleveland	4	1	0	0	0	0	2	10	0
Columbus	0	0	1	1	0	0	0	4	1
Indiana:									
Fort Wayne	0	1	0	0	0	0	0	0	0
Indianapolis	0	0	0	0	0	0	1	2	0
Illinois:									
Chicago	2	1	1	0	0	0	3	13	1
Springfield	0	0	0	0	0	0	0	2	1
Michigan:									
Detroit	2	0	3	0	0	0	1	5	0
Grand Rapids	0	0	0	0	0	0	0	2	1
Wisconsin:									
Madison	0	0	0	0	0	0	0	2	0
Milwaukee	0	0	0	0	0	0	0	1	0
Racine	0	0	1	1	0	0	0	0	0
Superior	0	0	0	1	0	0	0	0	0

City reports for week ended October 25, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Death	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	0	0	0	0	0	1	2	0
Iowa:									
Des Moines	0	0	0	0	0	0	0	2	0
Waterloo	0	0	0	0	0	0	0	1	0
Missouri:									
Kansas City	0	0	0	0	0	0	0	4	2
St. Joseph	0	0	0	0	0	0	0	1	0
St. Louis	6	2	0	0	0	0	0	0	0
North Dakota:									
Fargo	0	0	0	0	0	0	0	1	0
South Dakota:									
Sioux Falls	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	0	0	0	0	2	2	1
District of Columbia:									
Washington	0	0	1	0	0	0	1	1	1
Virginia:									
Lynchburg	0	0	0	0	0	1	0	0	0
North Carolina:									
Raleigh	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	1	0	2	0	0	0	0
Greenville	0	0	0	0	0	0	0	1	0
Georgia: [1]									
Atlanta	0	0	0	0	2	2	0	0	0
Florida:									
Miami	0	0	0	0	1	0	0	0	0
EAST SOUTH CENTRAL									
Kentucky:									
Covington	1	1	0	0	0	0	0	0	0
Tennessee:									
Memphis	3	0	0	0	0	0	0	0	0
Nashville	0	0	0	0	0	1	0	0	0
Alabama:									
Birmingham	0	0	0	0	2	1	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	2	0	0	0	2	2	0	0	0
Shreveport	0	0	0	0	1	0	0	0	0
Oklahoma:									
Oklahoma City	0	0	0	1	0	1	0	1	0
Texas:									
Houston	0	0	0	0	0	1	1	0	0
MOUNTAIN									
Colorado:									
Denver	0	0	0	0	0	0	0	1	1
Utah:									
Salt Lake City	2	1	0	0	0	0	0	0	0
Nevada:									
Reno	0	0	0	0	0	0	0	1	0
PACIFIC									
Washington:									
Seattle	2	1	0	0	0	0	1	2	0
California:									
Los Angeles	2	0	0	0	0	1	0	7	1
Sacramento	0	0	0	0	2	1	0	0	0
San Francisco	1	0	0	0	0	0	0	18	1

[1] Typhus fever, 3 cases at Savannah, Ga.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended October 25, 1930, compared with those for a like period ended October 26, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, September 21 to October 25, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929
98 cities	58	83	[2] 62	97	72	112	71	135	[3] 79	134
New England	51	76	49	88	53	94	64	128	97	110
Middle Atlantic	33	60	43	62	42	75	35	88	36	86
East North Central	75	90	80	124	100	139	92	155	106	163
West North Central	57	100	[4] 62	108	66	123	74	167	65	137
South Atlantic	92	112	62	129	106	139	92	180	97	139
East South Central	34	137	115	157	108	232	162	171	202	185
West South Central	146	164	112	198	64	255	127	339	[3] 88	396
Mountain	60	26	[5] 9	26	43	0	17	70	60	26
Pacific	31	65	[6] 62	56	94	60	102	87	118	121

MEASLES CASE RATES

	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929
98 cities	18	13	[2] 19	16	22	22	36	30	[3] 37	30
New England	42	18	33	34	31	16	44	58	69	29
Middle Atlantic	13	10	12	12	16	12	23	17	30	21
East North Central	13	13	5	12	11	29	14	40	16	47
West North Central	28	10	[4] 73	10	76	23	140	31	140	21
South Atlantic	9	13	20	11	11	9	7	9	13	9
East South Central	74	0	0	0	20	14	7	0	27	21
West South Central	11	11	7	0	0	4	4	4	[3] 4	15
Mountain	26	44	[5] 73	35	112	61	189	52	137	26
Pacific	19	21	[6] 27	65	24	65	66	72	21	63

SCARLET FEVER CASE RATES

	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929
98 cities	72	95	[2] 74	102	97	114	123	138	[3] 123	138
New England	80	99	73	135	106	162	148	173	144	162
Middle Atlantic	33	42	49	48	54	48	90	69	82	75
East North Central	118	161	107	149	137	173	179	214	172	192
West North Central	76	108	[4] 73	119	91	140	114	173	114	173
South Atlantic	57	105	70	120	115	139	115	127	148	174
East South Central	128	75	74	82	182	123	148	232	169	109
West South Central	56	72	37	72	37	130	78	103	[3] 73	149
Mountain	94	139	[5] 118	131	283	148	232	157	163	235
Pacific	87	84	[6] 89	128	87	87	59	113	104	104

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930, and 1929, respectively.
[2] Kansas City, Mo., Great Falls, Mont., and Spokane, Wash., not included.
[3] Fort Smith, Ark., not included.
[4] Kansas City, Mo., not included.
[5] Great Falls, Mont., not included.
[6] Spokane, Wash., not included.

Summary of weekly reports from cities, September 21 to October 25, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

SMALLPOX CASE RATES

	Week ended—									
	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929
98 cities	3	4	[2] 1	7	2	7	2	12	[3] 2	10
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	1	0	0	0	0
East North Central	3	3	1	7	2	3	4	7	2	12
West North Central	13	8	[4] 0	2	6	13	0	21	0	31
South Atlantic	0	0	2	0	0	0	0	0	0	0
East South Central	0	0	0	48	0	0	0	0	0	0
West South Central	4	0	4	0	4	4	4	0	[3] 8	0
Mountain	0	96	[5] 0	52	0	96	26	122	0	52
Pacific	19	10	[6] 2	36	7	34	0	84	21	51

TYPHOID FEVER CASE RATES

	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929
98 cities	18	20	[2] 20	16	21	26	17	17	[3] 18	15
New England	11	7	11	11	20	16	9	9	27	16
Middle Atlantic	14	12	15	14	14	10	11	8	13	8
East North Central	9	9	9	12	9	8	7	10	5	7
West North Central	15	23	[4] 13	15	9	8	15	25	8	6
South Atlantic	51	17	38	30	64	26	57	24	37	21
East South Central	20	82	67	21	47	27	47	68	94	48
West South Central	37	27	56	8	52	27	22	15	[3] 27	42
Mountain	43	313	[5] 118	113	43	719	34	192	77	200
Pacific	14	10	[6] 20	10	19	7	26	19	19	5

INFLUENZA DEATH RATES

	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929
91 cities	3	5	[7] 3	6	5	8	5	8	5	9
New England	2	2	0	4	4	0	7	2	2	0
Middle Atlantic	2	5	2	7	7	8	4	6	7	12
East North Central	2	4	1	5	3	8	4	9	3	10
West North Central	0	3	[4] 0	6	6	3	3	9	9	3
South Atlantic	4	6	2	7	2	11	5	9	4	4
East South Central	15	0	15	0	0	22	0	7	7	22
West South Central	4	12	11	16	11	16	8	16	8	20
Mountain	0	17	[5] 18	0	9	26	9	17	9	17
Pacific	6	3	3	9	0	6	9	6	9	3

PNEUMONIA DEATH RATES

	Sept. 27, 1930	Sept. 28, 1929	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929
91 cities	58	67	[7] 60	77	73	80	74	97	89	108
New England	35	72	40	36	64	74	80	97	91	63
Middle Atlantic	76	72	63	93	78	87	74	118	108	144
East North Central	48	54	54	61	55	65	51	81	53	91
West North Central	35	81	[4] 81	108	86	54	53	69	59	72
South Atlantic	51	60	48	81	79	103	88	81	125	112
East South Central	74	119	118	30	140	104	184	112	96	134
West South Central	77	94	77	113	119	113	96	90	134	86
Mountain	51	70	[5] 137	87	94	122	189	122	77	122
Pacific	49	38	49	47	49	57	80	82	74	44

[2] Kansas City, Great Falls, Mont., and Spokane, Wash., not included.
[3] Fort Smith, Ark., not included.
[4] Kansas City, Mo., not included.
[5] Great Falls, Mont., not included.
[6] Spokane, Wash., not included.
[7] Kansas City, Mo., and Great Falls, Mont., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended October 25, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended October 25, 1930, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia						1
New Brunswick						3
Quebec				4		53
Ontario	1		4	37	16	13
Manitoba	1			4		
Saskatchewan				5		6
Alberta				4		3
British Columbia		10		1		17
Total	2	10	4	55	16	96

[1] No case of any disease included in the table was reported during the week.

Quebec—Communicable diseases—Week ended October 25, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended October 25, 1930, as follows:

Disease	Cases	Disease	Cases
Chicken pox	90	Poliomyelitis	4
Diphtheria	59	Scarlet fever	105
Erysipelas	2	Smallpox	1
German measles	3	Tuberculosis	57
Influenza	5	Typhoid fever	53
Measles	52	Whooping cough	60
Mumps	33		

DENMARK

Communicable diseases—August, 1930.—During the month of August, 1930, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	4	Paratyphoid fever	22
Chicken pox	8	Poliomyelitis	18
Diphtheria and croup	369	Puerperal fever	17
Erysipelas	258	Scabies	693
German measles	4	Scarlet fever	201
Influenza	3,423	Tetanus	6
Lethargic encephalitis	6	Typhoid fever	24
Measles	645	Undulant fever (Bac. abort. Bang)	48
Mumps	298	Whooping cough	1,301

JAMAICA

Communicable diseases—Four weeks ended October 11, 1930.—During the four weeks ended October 11, 1930, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the Island of Jamaica outside of Kingston as follows:

Disease	Cases: Kingston	Cases: Other localities	Disease	Cases: Kingston	Cases: Other localities
Chicken pox	1	8	Puerperal fever		1
Dysentery	1	1	Tuberculosis	25	69
Leprosy		3	Typhoid fever	14	74

PANAMA CANAL ZONE

Communicable diseases—September, 1930.—During the month of September, 1930, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	1		Measles	8	
Chicken pox	7		Mumps	1	
Diphtheria	26		Pneumonia		32
Dysentery (amebic)	12		Tuberculosis		25
Leprosy		1	Typhoid fever	3	2
Malaria	131	4	Whooping cough	9	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	Nov. 1, 1930
Afghanistan	C			P[1]				P										
China:																		
Amoy	C										1	1						
	D										1	1						
Canton	C	3	2	2										1				
	D			1														
Shanghai	C								8	4		22	23	5	6	4		
	D									1	1	1	2			2		
Shensi Province	C											P						
Swatow	C	3	7		1			2	1	1								
Tientsin	C							2	1									
India	C	56,311	37,102	26,121	7,199	11,597	11,993	12,104	14,249	11,823	13,672							
	D	44,878	25,711	13,822	3,676	6,033	6,315	6,304	5,879	5,732	6,409							
Bassein	C	7								1								
	D	5																
Bombay	C				3	2	3	6			1		1	3	1	11		
	D				2	1	1	4			2		1	2		8		
Calcutta	C	609	327	220	18	10	17	18	8	10		9	4	4	7	9		
	D	372	179	128	7	7	10	6	3	3		6	3	4	4	4		
Negapatam	C		1															
	D		1															
Rangoon	C	9	6	1	1				1	1					1			
	D	3	4	1	1				1						1			
India (French):																		
Chandernagor	C	6	3	1						1								
	D	6	2															
Karikal	C		3															
	D		3															
India: Portuguese	C						1			1								

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	Nov. 1, 1930
Indo-China (see also table below):																		
Pnompenh	C	1	40	32	5	3	3						1		1			
	D	5	18	22	3	2	1											
Saigon and Cholon	C	160	48	10	2	2	1						1	1				
	D	101	23	3		1												
Philippine Islands: [2]																		
Ports—																		
Cebu	C		1	65	5	4			1	1								
	D			36	4	4			1	1								
Iloilo	C			29	9	19	32	4	3	4	1	2	1					
	D			22	10	18	19	9	4	5	2	3	2			2		
Manila	C	1				1			16	13	10	4	2	1	2			
	D								5	6	1			1				
Provinces—																		
Antique	C				14	3		3	2	25	12	8	12		23			
	D				7	3		2	1	14	12	7	8		10			
Bohol	C					54	54	30	30	14	4	1						
	D					29	32	18	12	6	2							
Bulacan	C		3	4	1				1	2	1			2				
	D		1						1	1				1				
Capiz	C			3	1	1			1									
	D			2	1	1												
Cebu	C	1	355	713	55	26	4		1	16	8							
	D	1	170	363	32	15	3		1	6	4							
Iloilo	C		2	309	143	209	127	92	71	60	61	46	18	7	13	12	10	10
	D		1	193	77	143	91	65	45	45	35	26	15	6	7	12	7	7
La Union	C			1														
Leyte	C		47	11														
	D		19	11														
Masbate	C		10	92	15	19												
	D		3	35	5	9												
Misamis, Occidental	C			3														
	D			3														
Negros, Occidental	C	10	140	568	151	79	45	68	40	43	24	15	8	10	5	5	12	3
	D	7	88	368	97	64	33	43	32	30	20	9	6	5	6	3	12	3

Negros, Oriental	C			23	6	2												
	D			13	1	3												
Nueva Ecija	C			1														
	D			1														
Pampanga	C		2	2					1									
Pangasinan	C			3	1													
	D			2	1													
Rizal	C		1	1														
	D		1	1														
Samar	C					5	3	10			3	1	4			3	6	3
	D					5	3	8			2		4			3	5	1
Surigao	C					15	2	11	1				(1)					
	D					9	2	6	2									
Tarlac	C				1													
Siam	C	33	27	20		1	1	1							1	3		
	D	21	19	9		1		1								1		
Bangkok	C	9	12	8			1								1	2		
	D	3	5	3			1								1	1		
Nagara Pathom	C																	
	D																	
Songkla	C			10														
	D			6														
On vessel:																		
S. S. Malwa from Shanghai	D											1						
S. S. Sassari at Massoua, from Jeddah	C	1																
	D	1																
On small boat at Port Cebu, from Bantayan Island	C		1															
	D		1															

Place		April, 1930	May, 1930	June, 1930	July, 1930			August, 1930			September, 1930			Oct. 1-10, 1930
					1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-30	
Indo-China (French) (see also table above):							1		3					
Annam [3]	C	60	23	16			43	37	22		23	13	2	16
Cambodia [3]	C	24	88	144			46	22	5		9	6	18	14
Cochin-China [3]	C	48	671	273										

[1] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, Philippine Islands.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	Nov. 1, 1930
Algeria:																			
Algiers	C				3		1		6	1	2	6	2	1	1	2	2		
Constantine	C			1															
Oran	C				3	1	1	1	1	1	2	3	4		4	4	2		
Philippeville	C										1			1		1	1		
Azores: Ponta Delgada	C	8																	
	D	5																	
Belgian Congo	C				2	1		1		2	3								
	D				2	1		1			3								
British East Africa (see also table below):																			
Tanganyika	C	41																	
	D	20																	
Uganda	C	117	227	406	225	52	67	62	55	44	40	57							
	D	105	195	328	213	50	64	62	53	37	39	55							
Canary Islands: Las Palmas	D					1													
Ceylon:																			
Colombo	C	1	6	1	3			1	1	2				1	1				
	D	1	5	1	3			1	1	3				1	1				
Plague-infected rats		4		1	1														
Chile: Antofagasta	C	1																	
	D	1																	
China: Manchuria—Tungliau and Nungan	C								30			29	P	2					
Dutch East Indies:																			
Batavia and West Java	C	87	82	93	84	19	30	20	14	13	14	26	26						
	D	81	82	98	84	19	30	20	14	12	14	26	24						
Plague-infected rats		8	5	4			1				1	1	1						
Java and Madura	D	173	185	202	217	45	51	47	45	55	54	67							
Ecuador (see table below).																			
Egypt:																			
Alexandria	C	2	13	19	23	2	2	4	3	3	3	2	2	2	1	3	3	2	1
	D	2	3	9	10	2	1	3		5	1	2		3	1	1	1	3	
Assiout	C	14	20	9	2														
	D	5	5	3	2														
Beni-Suef	C								1										

Dakahlieh	C	5	11	1															
	D		2																
Gharbieh	C	1				3													
	D	1				1													
Girga	C	1			1					1									
Minieh	C		7	10	3														
	D		1	1															
Port Said	C	1	2	2	1	1												1	
France:																			
Marseille	C									2	2	1					4	2	
St. Ouen	C				1														
	D				1														
Gambia	C								4										
	D								4										
Greece (see also table below):																			
Patras	C			1	1														
Pyrgos	C														2				
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats				1															
India	C	2, 215	648	240	377	145	189	293	250	593	600	704							
	D	1, 960	635	187	256	98	84	154	141	262	291	328							
Bassein	C									1		1							1
	D									1		2							
Bombay	C	4	6	3	1						1			1			1		
	D	8	5	2	1						1				1		1		
Plague-infected rats		108	81	26	52	10	8	9	9	12	9	11	15	21	13	16	14		
Madras Presidency	C	44	38	39	47	35	21	7	18		47					7			
	D	19	11	22	31	13	9	1	11		23					9			
Rangoon	C	5	4	1	2	2	1			2	1	5	2	2					1
	D	4	3	1	2	1	1			2	1	4	2	2					1
Plague-infected rats		4	5	1	6	4		2	1	2		2	4		1				
India (Portuguese)	D		7					P											
Indo-China (see also table below):																			
Pnompenh	C	3	3	6	2		2		2	2	1			1	1				
	D	4	1	7	2									1	1	1			
Saigon and Cholon	C		1	2				1			1			1					
	D			1															
Iraq: Baghdad	C	6	37	28	18	4	3	2						1					
	D	2	18	15	7		2	1						1					
Japan: Osaka (vicinity of)—Plague-infected rats		3																	
Kwang-Chow-Wan	C	37	34	31	4			1											
Madagascar (see also table below): Tamatave	C	1		1	1	2					1	P			1			1	
Morocco	C	121	71	3	1		8	7											
	D	45	34	4			1	1											
Nigeria: Lagos	C		2	5	1	2	1	3	1	1	1	3	1		3		2		
	D		2	5	1	2	1	3	1	1	1	3	1		3		2		
Plague-infected rats		7	17	11	18			4	4		4	2	4						
Senegal (see table below).																			
Siam	C	5	5			2	3		2	3								3	1
	D	6	4			1	3		2	2								3	1
Bangkok	C		5			1	2												
	D		4				2												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	Nov. 1, 1930
Siam—Continued.																			
Nagara Pathom	C	10																	
	D	9																	
Nagara Rajsima	C	1				1			1		1								
	D	1				1			1		1								
Syria: Beirut	C			12	9		1		1	3	2							1	
Tripolitania	C							2											
Tunisia:																			
Sfax district	C	1	21	9	6		1												
Tunis	C	4	1	1	5														
	D			1	1														
Union of Socialist Soviet Republics:																			
Salsk Region	C			2	5	4		3											
	D			1	4	3		2											
Stavropol Region	C			1															
	D			1															
Union of South Africa:																			
Cape Province	C		P	1'	1				1				1						
	D				1			1											
Orange Free State	C	1								1		1							
	D									1		1							

Place		Apr., 1930	May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930
British East Africa (see also table above):							
Kenya	C	16	171	107	97	87	
Ecuador: Guayaquil	C	0	0	0			
	D	0	0	0			
Plague-infected rats		0	0	0			
Greece (see also table above)	C	1		1			
Indo-China (see also table above)	C	4		11	1	2	4
Madagascar (see also table above):							
Ambositra Province	C	14	1				
	D	12	1				
Antisirabe Province	C	46	19	3	24		
	D	45	19	3	24		
Miarinarivo Province	C	1	5	1	1		
	D	1	5	1	1		
Madagascar—Continued.							
Moramanga Province	C	3	1	3			
	D	3		3			
Tananarive Province	C	39	15	16	28		
	D	38	14	16	28		
Senegal:							
Baol [2]	C	24	13	2	62	79	48
	D	12	11	2	48	20	23
Dakar [2]	C	2	52	53	140	108	3
	D	2	42	117	122	90	8
Louga [2]	C	33	54	60	138	75	61
	D	10	27	21	103	33	30
Thies [2]	C	12	21	52	54	34	12
	D	9	8	35	30	20	4
Tivaouane [2]	C	71	135	43	119	110	20
	D	38	69	28	70	54	14

SMALLPOX

Place		Apr. 6–May 3, 1930	May, 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930					September, 1930				October, 1930			
						2	9	16	23	30	6	13	20	27	4	11	18	25
Algeria:																		
Algiers	C	1	3		1		1		2									
Constantine	C			1	1													
Arabia: Aden	C	1			1													
Bolivia: La Paz.[1]																		
British East Africa (see also table below):																		
Tanganyika	C	57	409	1,610	168	26	51	44	121	198	288		36					
	D	14	70	301	42	4		3	30	4	55		1					
British South Africa:																		
Northern Rhodesia	C	1	59															
	D	2	9															
Southern Rhodesia	C	66	155	9	31				1	1								
	D	1	13															

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25
Canada:																		
Alberta	C	4			5	1							1		13	8	1	
Edmonton	C	3																
British Columbia—Vancouver	C	17	4	2	6	1	1	2	2			1	1	1			1	
Manitoba	C	4	10	4						1								
Ontario	C	77	82	47	24	8	3	5	4	2	2	6		1		3	15	
North Bay	C		1															
Ottawa	C	21	25	15	13	5	1	1		2	1	2						14
Toronto	C		4	4	1							1						
Quebec	C			4	3		2	2	1									
Montreal	C					7												
Saskatchewan	C	41	39	22	5				8			1			3			
Regina	C		4															
Ceylon: Angoda, Western Province	C	6																
	D	2																
China:																		
Canton	C	3																
	D	3																
Changking	C	P	P	1	P	P		P	P	P	P	P	P					
Foochow	C	P	P	P	P		P		P		P		P		P			
Hong Kong	C	18	12	4	2													
	D	23	9	3	1													
Manchuria—																		
Harbin	C	1	20	4	3			2										
Kwantung—Dairen	C	2	8	16	8													
	D		4	1														
Nanking	C	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P		
Shanghai—																		
Foreigners only	C	3	2	5	4	3						18					1	
Including natives	D	10	5	3								2						
Swatow	D	3	6	4	1	1		2	1	1	1			1				
Tientsin	C	2	1											1				

Colombia:																		
Barranquilla	C	1				2												
Buenaventura	C	15	4	6	10		1	1										
Costa Rica:																		
Port Limon	C	6	2	2														
San Jose [1]	C	7	2															
Curacao (alastrim)	C	2	2	1	2			1										
Dutch East Indies:																		
Borneo	C	90	16	12	2													
	D	31	1	1														
Java—																		
Batavia and West Java	C	64	12	13	8	1	4	5	2	2	5	2	2			1		
	D	11	7	3	5	1	1	1	2	2		1	1			1		
East Java and Madura	C	4			1													
Sanggi Islands	C	160	26		11	36				14								
	D	24	5		3	2				3								
Egypt: Port Said	C	1	1		3													
France (see table below).																		
Great Britain:																		
England and Wales	C	1,427	1,417	926	529	70	86	95	93	99	106	75	61	82	74	44	125	
Ashton under Lyne	C	18	17	7	8													
Bradford	C	3	2		1										1		1	
Cardiff	C	3			2													
Leeds	C	2			1													
London	C	602	637	498	250	36	50	41	51	43	44	36	41	30	34	23	33	
London and Great Towns	C	1,066	1,078	753	408	61	73	71	80	79	84	51	54	55	56	32	80	
	D	3																
Sheffield	C	2																
Stoke-on-Trent	C	85	62	32	9	1	1					1	1			1		
Scotland	C			4	1						5							
	D				1													
Honduras: Naco	C											5						
India	C	34,843	22,835	12,962	7,630	11,313	1,282	1,236	1,046	830	940	610						
	D	6,983	5,451	3,531	2,348	368	327	290	261	202	209	119						
Bombay	C	430	218	113	30	6	2	2	2	2	1	1	2					
	D	270	161	79	33	5	2	1	2	2	1	2						
Calcutta	C	495	302	161	73	4		12	9	4	5	3	2	3	4	3	2	
	D	403	258	146	56	4		8	9	3	4	1	1	3	4	3	1	
Cochin	C	183	37	16	6	2	4	4	4	1	1		1			8	4	
	D	13	8	4						1						1		
Karachi	C	30	14	7	1	2		2				1	3					
	D	17	4	3		2		1					2					
Madras	C	133	72	35	49	19		9	10	9	11	6	8	4	4	8	3	
	D	27	15	10	12	3		5	3	1	1	1	3	1	2	3	2	
Moulmein	C	43	89	21	18				2	1								
	D	7	21	7	1				1			1						
Negapatam	C		1	2	4	2		2		1	2		6	4	2	5	3	
Rangoon	C	4	6	9		1	1	1										
	D		1	2														
Tuticorin	C		5	1													1	

[1] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica, outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 6-May 3, 1930	May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	Week ended—												
						August, 1930					September, 1930				October, 1930			
						2	9	16	23	30	6	13	20	27	4	11	18	25
India—Continued.																		
Vizagapatam	C	6	5	1												1		
	D	2	3															
India (French):																		
Chandernagor	C	10	24	19	4							1	2					
	D	2	7	3	3						1	1						
Karikal	C	19	12	11	2		8		1		5			1				
	D	8	3	8	2		8		1		2			1				
Pondicherry Province	C	24	40	23	26	7	8		7	11	7	7	10	11				
	D	20	36	23	25	7	8		7	11	7	7	8	11				
India (Portuguese)	C	44	47	28	1	1	6	1	1	1	2							
	D	8	8	10	1	1			1									
Indo-China (see also table below):																		
Pnompenh	C		3		1											2		
	D	2		1	1			1										
Saigon and Cholon	C	5	3	1			1			1								
	D	5	2			1	1	1		1								
Iraq:																		
Baghdad	C	8	1	1	3			1					1		2			
	D	1	1		1			1										
Basra	C	1																
Mossoul Liwa	C	22	21	4	67									63		4	2	
	D	3	3	1	20									27				
Ivory Coast (see table below).																		
Jamaica (alastrim)	C		2															
Japan: Tokyo	C	1																
	D	1																
Macao	D	2	1															
Mexico (see also table below):																		
Jalisco (State) Guadalajara	D	20	7	15	4		1								2		1	1
Juarez	C			6			2							1				
	D			1			1											
Mexico City and surrounding territory	C	99	80	77	37	2	3	3	2	7	2	1	2	1	3			
	D	47	32	17	8	1	3	2		1	1	1	2					

Progreso	C		1															
	D		1	1														
Morocco (see table below).	C																	
Nigeria: Lagos	C	1		1														
Poland		7	3	2														
Portugal:																		
Lisbon	C	8	8	10	13		6	19	25	7	8		12	4	5		7	
Oporto	C								1									
Siam	C	8	2		6													
	D	4			3													
Somaliland, British: Boales	C														1			
	D														1			
Spain	C			12	5	2					4	1						
Straits Settlements	C	5	11	9	11	1	1	5	1	1	2	2	1	1	1	1	2	
	D	2	3	2	3		1	1	1		1					1		
Sudan (Anglo-Egyptian)	C	42	19	67	12				42	102	5	20	12	251	1	56		3
	D	4	2	3	1				3	50	2			2		5		
Sudan (French) (see table below).																		
Switzerland: Berne Canton	C				1	1	1							1				
Syria (see table below).																		
Taiwan: Taihoku (see table below).																		
Tunisia: Tunis	C	4	2	2	1								2					
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P		P						P		P					
Orange Free State	C				P	P												
Transvaal	C						P	P	P	P	P	P						
Upper Volta	C	3	1	13														
On vessel:																		
S. S. Elysia, at Port Sudan, from Bombay	C	1																
S. S. Naldera, at Port Said	C		1															
S. S. Manoa, from Honolulu to San Francisco	C				1													

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930			August, 1930			September, 1930			Oct. 1-10, 1930
						1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-30	
Indo-China (see also table above)	C	26	261	365	213			238	59	34		54	52	86	32
Ivory Coast	C	7													
Sudan (French)	C	609	521	274	76		34				39		P		
	D	49	36	32	18						3				
Syria: Beirut	C	17	19	7	7			2	1						
Taiwan: Taihoku	C	58	12												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		March, 1930	April, 1930	May, 1930	June, 1930	July, 1930	August, 1930
British East Africa (see also table above):							
Kenya	C	175	174	171	142	186	
Uganda	C			78			
	D			69			
Chosen	C	236	253	107		3	2
	D	53	53	35			
Seishin	C		5	2	1	2	
	D		1	1			
France	C	8	58	51			
Mexico: Durango (see also table above)	D	5	4	4	3	3	3
Morocco	C	17	10	18	5	3	8
Turkey	C		3	16			

TYPHUS FEVER

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25
Algeria:																		
Algiers	C	8	15	3	6				2		3							
Constantine Department	C	15	6	12	2				3						2			
Oran	C		3	4	3		1			1						1	2	
Bolivia: La Paz.[1]																		
Brazil: Porto Alegre	C		1															
Bulgaria	C	15	6	16	10		1				2	2		2		1		
	D	1	2	1	1													
China:																		
Manchuria—Harbin (see also table below)	C	52	13	8	2	2				2								
Shanghai	C						1											
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	1		1	1			1			1	1		1				
Beheira Province	C	2	49	45	15								1					
	D		13	4	2													

Cairo	C					[illegible]			[illegible]			[illegible]						
Port Said	C								4		1				1			1
Great Britain: Scotland—																		
Dunfermline	C				1													
Glasgow	C		1															
	D		1															
Greece (see table below).																		
Ireland:																		
Irish Free State—																		
Galway County—Oughterard	C				2													
Kerry County—Dingle	C	5																
Leitrim County—Mohill	C			9	1													
Mayo County—																		
Ballina	C		2	1	1													
Castlebar	C								1									
Swinford	C		14															
Westport	C				2	1												
Roscommon County—																		
Roscommon	C				1													
Strokestown	C				1													
Wicklow County—Shillelagh	C			4	2													
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico:																		
Durango	D												1	1		1		
Mexico City, including municipalities in Federal District	C	4	6	9	5	2	2	2	3	2	2	3				3		
	D	4	3	1		1	1				1	1				2		
Morocco	C	15	11	15	11				8		2							
	D	3																
Palestine	C	1	2	2	6		1	1	1		1	1	1		1	1	1	
Poland	C	243	171	117	36	10	15	2	7	2	3	6	12	3	6	6	7	
	D	15	5	11	4	1		1	1		1			1			1	
Portugal:																		
Lisbon	C	4																
Oporto	C	1						1							1	1	1	
Rumania	C	186	227	58	28	5		2	2	1		1	2					
	D	11	35	5	8	2												
Spain: Valencia	C			3	3							1						
	D				1							1						
Tunisia	C		6	18	24	2	5		3	1	1		4	1	1	1	9	
Turkey (see table below):																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P					
Natal	C	P	P	P	1	P	P	P				P						
Orange Free State	C		P	P	P	P	P	P	P	P	P	P						
Transvaal	C	P			P	P	P	P		P	P	P						
Yugoslavia (see table below).																		

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr., 1930	May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930
China: Harbin (see also table above)	C	204	240		14	5	
Chosen: Seoul	C	3	43	2	3	2	1
Czechoslovakia	C	29	12	1		1	
Greece: Athens	C	1	3	3	6	6	
Latvia	C		3	3	3	1	
Lithuania	C	73	27	16	18	7	3
	D	4				1	
Turkey	C	3	16	2		2	
Yugoslavia	C	22	16	6			
	D	4	1				

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Ry., between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

UNITED STATES TREASURY DEPARTMENT

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SPECIAL ARTICLES

A Mild Recurring Epidemic Simulating Food Infection
Summary of Current Prevalence of Communicable Diseases
Report on the Antiplague Campaign in Guayaquil
Maternal Mortality in the United States in 1929

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of the public health.

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PREVALENCE OF DISEASE

PUBLIC HEALTH REPORTS

VOL. 45 NOVEMBER 21, 1930 NO. 47

AN UNUSUALLY MILD RECURRING EPIDEMIC SIMULATING FOOD INFECTION

By R. R. SPENCER, *Surgeon United States Public Health Service*

In various localities of the northwest mountainous section of the United States a mild dysentery-like epidemic has occurred from year to year. The infection has been strictly seasonal, practically all of the cases occurring during the hottest and driest months of the year, July and August. For the past few years it has been more noticeable in certain of the national parks where large numbers of tourists are assembled during the summer months, but the condition has never been limited to these areas. On the other hand, the condition herein described has not affected, so far as known, the large centers of population in the East.

In 1929 an unusually large number of cases occurred in Yellowstone Park, and affected both tourists and employees at every hotel and camp. First-hand information was not obtained during the summer of 1929, but the following chronological history of the epidemic as it occurred at the Lake Hotel was obtained from the hotel manager, who had kept a written record:

August 4, 1929: In the early morning six employees of the hotel (total number of employees, 155) complained of being sick during the preceding night. The symptoms were practically identical in each case. About 1 a. m. they were taken with nausea, vomiting, sharp pain in the abdomen, and diarrhea. After a few hours they went back to sleep with no further symptoms.

The manager learned on this date that four days earlier two national-park rangers of the Lake ranger station near by had complained of a similar affection.

In the early afternoon of the same day one maid at the hotel became sick, and at 5 p. m. two porters became ill, and from then on one employee after another was taken sick in rapid succession until about 80 had become ill with the same symptoms of nausea, vomiting, and diarrhea. Those taken ill in the afternoon felt much better by midnight, took some broth, and were able to work the next morning, although they were quite weak.

August 5, 1929: At 1 a. m. many guests became ill at about the same time. The hotel manager and two national-park nurses took care of about 20 guests with symptoms of nausea, vomiting, and diarrhea. These guests had requested medical assistance. There were at least 20 or 30 more who reported their illness about 8 a. m., but had not called anyone earlier. The same morning all guests, with one exception, were well enough to make their departure. This one patient had had "stomach trouble" since leaving Los Angeles. At 8 a. m. Dr. G A.

Windsor, the park physician, arrived from the hospital at Mammoth and visited all the sick employees and guests. All employees except three or four were able to return to work the same day, though they were quite weak. A few showed a slight elevation of temperature; many were subnormal.

During the day and evening several more employees became ill and were cared for by the nurse. On this date all the kitchen utensils—dishes, knives, and forks—were thoroughly scoured and subjected to flowing steam. No guests complained of illness during the day.

August 6, 1929: In the morning several guests reported that they had been ill during the night but then felt all right, except for weakness.

During the day many more employees were taken sick. The actual number was not ascertained, but the hotel manager stated that by this time not more than 15 employees out of 155 had been entirely free from symptoms. There were no calls from guests during the night.

August 7, 1929: In the morning several guests reported that they had been ill during the night. They were able, however, to leave the hotel.

There were no further cases reported until 5 p. m., when several guests reported their illness. These cases seemed more violent than the previous ones. Several persons from the busses arriving at the Lake Hotel from Old Faithful Hotel at 5 p. m. complained of the same symptoms and were immediately put to bed.

Five employees, who were ill on August 4 and had apparently recovered, became ill again with the same symptoms of nausea, vomiting, and diarrhea. At 8 p. m. many guests became ill; two women were taken so suddenly that they vomited before they could leave the dining-room table. It was estimated that during the night over 200 out of 335 guests were sick. Many guests became hysterical from fright.

August 8, 1929: About 80 people were unable to leave until 2 o'clock in the afternoon, and about 45 remained over until the next day. It is very rare for tourists to spend more than one night at each of the four large hotels in the park. During the day three hotel employees were taken sick a second time after apparent recovery from the first attack. On this day all water for the dining-room service was boiled. Ice cream was taken off the menu. Samples of milk and ice cream used at the Lake Hotel on the night of August 7 were sent to Helena, Mont., for bacteriological examination. At a later date these samples were reported as satisfactory. Several persons volunteered to eat two helpings of ice cream taken from the same container from which the guests were served on the night of August 7. No ill effects followed. Ripe olives were not on the menu.

Four more cases were removed from the busses arriving from the Old Faithful Hotel at 5 p. m. At 10.30 p. m. calls began to come in, and by 2 a. m. the nurse and doctor had attended about 20 new cases. These cases seemed less severe than those of August 7. There were many more patients who made no calls for assistance, but reported their illness the next day.

August 9, 1929: Eleven guests remained until 1 p. m. and two remained overnight. No new cases occurred during the day. Two cases developed, as on previous days, in people arriving from Old Faithful.

August 10, 1929: No cases occurred during the day and no guests complained during the night, but one reported his illness the next morning.

It was the opinion among the guests, and even the opinion of a physician among the guests, that the cases were due, undoubtedly, to food poisoning. Many said that the ice cream had made them sick; some thought it was the salad, others the meat, and so on,

until nearly every item of food had been mentioned as the cause. The manager and the park physician, Doctor Windsor, had attempted to find what item of food had been eaten by all the sick persons, but this inquiry disclosed no common item. Many sick people had not eaten ice cream, others had not eaten salad, while others had not eaten meat.

EPIDEMIC AT OTHER PARK RESORTS AND OTHER LOCALITIES

While the Lake Hotel had the severest outbreak, the other three park hotels also had many cases among guests and employees during the same period, August 4–10. It was not difficult to elicit this information when inquiries were made of the nurses, the hotel managers, and the employees at each hotel. As far as could be ascertained, at least half of the employees throughout the park had the disease, regardless of their duties and of the company by which they were employed or the source of their food and water. At the Mammoth Lodge it was learned from the nurse that one night (about August 8 or 9) over one-half of the employees out of a total of 100 had nausea and vomiting, and so many of them were off duty the following morning that the tourists complained about the lack of service. Many of the guests were also taken sick, but no record was kept of the number of guests or of employees who were ill. Cases continued to occur for days, but the number gradually diminished. Cases occurred also among the employees of the Hamilton Stores Co. and the Whittaker Stores Co., and among the forest rangers of the National Park Service. According to reports made to the forest rangers and by personal inquiries made by the writer, cases were also numerous among the automobile tourists who have their own equipment, sleep in tents, and frequently bring their own food. Upon further inquiry it was learned that at least three persons had been taken ill the first day upon entering the park and before either food or water had been taken from park sources.

For some years Sanitary Engineer H. B. Hommon, of the United States Public Health Service, has conducted sanitary inspections of the large national parks in the West. He states that the malady in Yellowstone Park this year was similar to what has occurred in all the parks of the Northwest and sections adjacent thereto for several years, and that these disturbances are more or less common throughout the Western States. Mr. Hommon predicted another outbreak and recommended in April of 1929 that some medical officer be detailed to one of the parks early in the season in order to be present when an outbreak occurred.

It was also of interest to learn that old residents at Yellowstone, as well as at Crater Lake National Park, stated that the illness had been observed for many years.

The State health officer of Montana, Doctor Cogswell, also states that in the early pioneer days a similar malady was not uncommon among mining and logging camps.

There was reported to the Surgeon General of the United States Public Health Service the occurrence of 33 cases at Old Faithful Inn during the last week in July and the first week in August, 1925. The symptoms of cramps, nausea, vomiting, and diarrhea, lasting only 24 or 48 hours, undoubtedly identify the condition with that which has occurred during the season under report.

It was further learned through physicians at Livingston, Butte, Missoula, and Hamilton, Mont., that a similar affection had been prevalent among the people of these cities during July and August of 1929. Many families had three and four members coming down one after the other, usually within a period of two or three days.

At Butte, Mont., Dr. H. W. Gregg informed the writer that blood and stool cultures had yielded nothing definite, and the condition was associated with a high leucocytosis in the few cases in which blood counts were made. He felt that the disease had attacked a large proportion of the people and that children seemed to run a higher fever than adults.

CASES OCCURRING IN 1930

During the summer of 1930 the writer had the opportunity to see 38 of these cases and to obtain records of the occurrence and the symptoms of 57 others. These latter records were kept by the nurses at the various hotels and lodges in the park. Undoubtedly many additional cases occurred in the cabins and camps where there were no nurses to keep records, and it is fairly certain that in many others the symptoms were so trivial and the duration of the indisposition so brief that they were not reported at all.

The 95 cases were distributed throughout the park as follows:

Mammoth station	31
Norris Junction	4
Canyon station	23
Old Faithful station	27
Lake station	10
Total	95

These stations are some miles apart. The distance from Mammoth to Old Faithful is the greatest, being 50 miles.

The records of the 95 cases were obtained during the last few days in June and throughout the month of July. Table 1 gives the occurrence of cases by days. There was no instance during this season of an explosive outbreak such as occurred the preceding year at the Lake Hotel. It is seen that the cases as a whole were evenly dis-

tributed throughout the month of July; and, had they been tabulated by separate stations, the same even distribution would have been apparent. Cases occurred both before and after those here recorded, but after August 1 there were only a very few.

TABLE 1.—*Occurrence of cases, by days, June 29–August 3, 1930*

	June		July																															August			Total
Date	29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	....
Cases	1	1	0	2	1	0	4	3	7	3	0	0	3	4	3	6	0	4	7	3	4	8	5	3	6	1	4	2	9	0	1	0	0	0	0	0	95

In addition to the above-mentioned cases, it was learned that among a group of 30 employees of the Canyon Cafeteria (18 men and 12 women), all of whom ate in the same dining room, 17 cases occurred within a period of 12 days, July 10 to 22. Not more than two or three were taken sick during any one day.

A similar sequence of occurrence is shown by the cases in the officers' dining room of the Mammoth Hotel. Seven cases (included in our series) occurred out of a group of 20—two cases on July 8, one case on the 16th, one on the 17th, two cases on the 19th, and one case on the 20th. There were no more cases in this group up to August 5.

The chief ranger of the Teton National Forest, stationed at Moran, Wyo., about 25 miles south of Yellowstone Park, informed the writer that probably 50 persons out of a total of about 100 employees had suffered from the same malady during July. The condition, however, was not new to them, having occurred in previous seasons as well.

Symptoms.—The cardinal symptoms of this disease are nausea, vomiting, and diarrhea, and the most striking characteristics were the mildness and short duration of symptoms.

In one case only did diarrhea last for six days; in no other case did it last longer than three days. The average duration of symptoms was about 24 hours.

Many patients did not take to their beds at all. Thirteen cases had nausea and vomiting only; 19 had diarrhea only; and 35 had nausea, vomiting, and diarrhea. Twenty-four had no vomiting, but had nausea and diarrhea. There were many persons (not recorded) who complained of a slight nausea and abdominal discomfort lasting only a few hours. Twenty cases out of the total of 95 reported had a similar attack during the past season, and 2 had had it each year for several years past. Frontal headache was a rather common complaint. There were no nose bleeds or sore throats among any of them. In none of these cases did the physical signs or examination reveal anything characteristic. Many of them showed nothing at all

unusual; others had a definitely greenish pallor and complained of extreme weakness after vomiting. In nearly all cases the diarrhea was accompanied by griping pains in the abdomen.

In the majority of cases the temperature was normal or subnormal. A few had a slight elevation, the highest being 100.6° F.

The blood picture was fairly uniform, in that the great majority gave a definite leucocytosis. Differential counts on 23 cases revealed nothing of importance.

The white cell counts of the same 23 cases are given in Table 2. It can be seen that the leucocytosis was generally higher in those cases in which the test was done within 24 hours after onset than in those tested later.

TABLE 2.—*White cell counts and temperature in 23 cases*

Case No.	6 to 24 hours after onset	24 to 48 hours after onset	3 days or longer	Temperature at time blood was taken	Case No.	6 to 24 hours after onset	24 to 48 hours after onset	3 days or longer	Temperature at time blood was taken
				°*F.*					°*F.*
1		8,120			19	11,280			100.6
4	14,040			98.0	20	21,800			
5		11,660		98.0	22		15,480		
9	19,240			96.7	24	17,320			97.0
10	18,600			100.6	27		12,500		
11		15,360			29		12,280		99.0
12	15,760			97.0	30	12,980			98.0
13		10,280			31	22,400			99.8
14	17,360			99.2	35	11,400			98.6
15			12,320	97.0	36	12,280			97.0
17	17,160			98.4	38			8,960	
18			10,820	97.0					

The blood of eight cases, using from 5 to 10 c. c., was planted in flasks containing about 150 c. c. of glucose broth. Six remained sterile after 14 days' incubation at 37° C. The organisms from the two flasks which gave growth and which were thought to be contaminations were nevertheless injected intravenously into rabbits. They proved to be in no way pathogenic and did not resemble the dysentery group of organisms.

Throat cultures also were taken from 38 cases without yielding any organisms which could be suspected of being the cause of the malady.

Cultures of the stools were difficult to obtain under field conditions and were considered impractical, since the results would not be dependable. As previously mentioned, Dr. H. W. Gregg, of Butte, Mont., has reported that both blood and stool cultures from his cases were entirely negative.

The sera from six cases were tested against *B. enteritidis* and against *B. dysenteriae* (Shiga and Flexner) and *B. paratyphosus* B. They were all negative against *B. enteritidis*, *B. paratyphosus* B., and *B. dysenteriae* (Flexner). However, two agglutinated *B. dysenteriae* (Shiga)—one in a dilution of 1:160 and the other in a dilution of 1:320.

PARK ORGANIZATION

In order to understand the circumstances under which these epidemics have occurred, it is necessary to give a brief account of the park organization and the general sanitary conditions.

Yellowstone Park is controlled by the National Park Service under the Interior Department. Concessions are granted to the following organizations:

1. The Yellowstone Park Hotels Co. operates the four large hotels. One is located at Mammoth Hot Springs, 5 miles from Gardiner, Mont., the northern entrance to the park; one is at Old Faithful; one is at Yellowstone Lake; and one is located at the Canyon of the Yellowstone River. None of these hotels is within 20 miles of any of the others. They accommodate a total of about 3,000 people.
2. The Yellowstone Park Transportation Co. operates the busses for tourists to and from the hotels and lodges.
3. The Yellowstone Park Lodge & Camp Co. operates the lodges and surrounding cabins at each of the four large stations. They are located within 1 or 2 miles of the hotels.
4. Concessions are also granted to the Hamilton Stores Co., the Whittaker Stores Co., and the Haynes Stores Co. Each of these organizations operates stores at various points in the park.

GENERAL SANITATION

Water.—The water supplies of the park are derived either from mountain springs (which are protected from wild-animal depredations by concrete coverings or wire fences), or from the Yellowstone River or the lake. Inspections are made of all sources at least once every two weeks by a sanitary officer, and in the season of 1928 bacteriological examinations were made every two weeks. The water was found free at all times from bacteria of the colon group. Tests were again made during the present epidemic, and the samples were again found to be free from any organisms suggesting human or animal contamination. Chlorination of the water supplies has never been considered necessary. Each of the four large tourist stations—Mammoth, Old Faithful, the Lake, and the Canyon—has entirely different sources of water supply, and at some of the stations the source of the water for the hotel is not the same as that for the lodge and the automobile camps.

Sewage.—The sewage from the hotels and lodges at the Canyon and at the Lake stations is disposed of in septic tanks. The effluent is treated with an excess of chlorine. At Old Faithful the raw sewage is discharged into a boiling geyser hole, and at Mammoth it is discharged into the river below all sources of water supply. In some of the automobile camps sewage is discharged into underground cesspools which are well protected. There are no open privies of any kind.

Sanitary control.—An annual sanitary survey of the entire park, including a careful inspection of kitchens, refrigeration plants, dining rooms, garbage incinerators, water, and sewage, is made by Sanitary Engineer H. B. Hommon, of the United States Public Health Service. A similar inspection was made by the writer. Refrigeration of perishable foods and the preparation of foods in general were satisfactory. There seemed little opportunity for food spoilage. Flies were noticeably absent.

FOOD SUPPLY OF PARK

The food supply obtained by the various organizations for employees and guests comes from many sources. Each company, as well as the National Park Service, has an independent commissary department. At all the hotels and at all the lodges separate dining rooms for guests and employees are maintained, although the food is prepared in the same kitchens.

The milk supplies of all organizations are derived largely from dairies at Livingston, Mont. Pasteurization is carried out by these dairies. A few families at Mammoth use raw milk. Some canned milk is also used.

Meat and other perishable foods are transported to the park in refrigerator motor trucks.

DISCUSSION OF DIFFERENTIAL DIAGNOSIS

The New York State Department of Health has reported cases of diarrhea, cramps, vomiting, and marked prostration occurring at widely separated hotels in New York State and in New Jersey. A certain manufactured polish for removing tarnish from the silver was found to be used by all the hotels affected. Analysis showed that the polish contained 20.54 per cent sodium cyanide. Following the discarding of this type of silver polish, there was a prompt cessation of cases among guests. The Yellowstone hotels and lodges do not use a manufactured silver polish of any kind, and obviously one can exclude this as a possible cause of the illness.

Many people attributed the sickness to the pine pollen. During the dry season the forest rangers state that the pine pollen is sometimes so thick that large clouds of it resemble the smoke from a forest fire. Frequently acres of the surface of Yellowstone Lake are covered with this pollen, which is often taken for sulphur. Dr. H. M. Kelley, ranger naturalist, at the Lake station, assured the writer that the amount of pollen in the air reached a maximum about July 20 in 1929. Since the height of the epidemic came after August 1, it is unlikely that the pollen was the cause of the affection. Furthermore, some of the pollen was obtained and a small quantity ingested by several persons who had not suffered from the condition, and no ill effects followed.

Table 3.—*A comparison of the characteristics noted in this unknown condition with those found in botulism, bacillary dysentery, and food infections due to the paratyphoid enteritidis group of organisms*

	Botulism	Bacillary dysentery	Food infections	Unknown condition
Cause	Botulinus toxin	B. dysenteriae Flexner	Paratyphoid-enteritidis group	
		B. dysenteriae Shiga		
		B. dysenteriae Hiss		
Seasonal occurrence	Mainly in winter	Mainly in summer	Mainly in summer	Only in summer.
Associated with	Preserved foods usually home prepared.	Not associated with any special food.	Fresh foods; usually meat or meat salads.	Not associated with any particular food.
Mode of transmission	Ingestion of spoiled preserved food.	Food, water, flies, and insanitary conditions.	Contaminated and spoiled foods	Probably person to person or person to food to person.
Incubation period	Variable; usually after 24 hours	24 to 48 hours	Short; usually before 24 hours	Probably less than 24 hours.
Onset	Usually gradual	Sudden	Sudden	Sudden.
Abdominal pain	Absent	Present	Present	Present.
Condition of bowels	Constipation, rarely diarrhea	Diarrhea—mucous and bloody stool.	Diarrhea offensive; watery; frequently bloody.	Diarrhea—offensive, watery.
Visual disturbances	Double vision, ptosis of lids	None	None	None.
Prostration	Marked	Bedridden for several weeks	Variable; sometimes marked	Prostration rare; not severe enough to confine to bed.
Throat	Difficulty in swallowing	Normal	Normal	Normal.
Duration of illness	Variable	4 to 8 days in light cases; 3 to 6 weeks in severe cases.	24 to 48 hours	24 to 48 hours or less.
Immunity	No data	No data	No data	Second attacks frequent.
Mortality	60 to 70 per cent	10 to 60 per cent	1 to 2 per cent	None.
Fever	Not characteristic; usually subnormal.	101° F. to 103° F. for 1 or 2 weeks	Characteristic acute, short duration.	Usually subnormal; short duration when present.
Leucocytosis	None	12,000 to 16,000	Moderate leucocytosis	Average 10 to 15,000.
Occurrence	Can usually be traced to one item of food. All cases occur within a short period.	Epidemic and sporadic cases extending over a considerable period of time.	Can be traced to one item of food. All cases occur within a very short period.	Epidemic and sporadic cases extending over a considerable period.

Table 3 gives a comparison of the characteristics of this condition with those of botulism, bacillary dysentery, and food infections due to the paratyphoid enteritidis group of organisms. It may be seen at a glance that the mortality rate, the absence of association with any single item of food, the sequence of occurrence of cases, and the absence of neurotoxic symptoms immediately differentiate the condition from botulism.

From bacillary dysentery it seems also to be differentiated by the mortality rate, the duration of symptoms, and the height and duration of fever. It resembles bacillary dysentery, however, in that cases occur over a considerable period of time and are not associated with any special items of food or food spoilage.

This unknown condition, therefore, more closely resembles, at least symptomatically, the food infections caused by the the paratyphoid-enteritidis group of organisms; yet food infections can nearly always be traced to food spoilage or some one item of food (usually meats or meat salads) which has been ingested by all patients. The onsets of all such cases, therefore, occur within 12 to 24 hours of one another. This is not the case in the epidemics under discussion. For similar reasons it seems that epidemics of food poisoning due to the toxins of various staphylococcus strains [1] and traceable to a single item of food do not fit in with our cases.

In the United States naval medical bulletins from 1923 to 1929 a large number of mild epidemics of nausea, vomiting, and diarrhea of short duration have been reported. In order to contrast these outbreaks with our own cases, we give here a brief account of two of them.

An outbreak of food poisoning of mild type occurred on board the U. S. S. *Colorado* on the morning of June 28, 1927, following breakfast at which beef hash on French toast had been served. About 150 persons, or approximately 10 per cent of the crew, were affected, *all of whom ate in the general mess and gave a history of having eaten beef hash for breakfast.*[2] The same food had been served to the entire crew, but no others developed symptoms of food poisoning. *Symptoms in all patients occurred about three and one-half hours after breakfast.*[2] (U. S. Naval Med. Bull., 1928, vol. 26, p. 768.)

A similar outbreak occurred at the United States naval station, Olongapo, P. I., on May 27, 1927. Symptoms of nausea, vomiting, and diarrhea occurred from 2 to 12 hours after the noon meal. *All who became ill had eaten Vienna sausage at the noon meal.*[2] A gram negative, motile bacillus, that did not ferment lactose was isolated from the sample of sausage and identified as *Bacillus enteritidis.* (U. S. Naval Med. Bul., 1928, vol. 26, p. 770.)

The widespread distribution and the occurrence of the cases here reported over a considerable period of time prove that the mode of transmission is not identical with the cases recorded by the Navy. Furthermore, in some of the Navy epidemics there were a few fatal

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[1] Jordan, E. O.: Jour. Amer. Med. Assoc., vol. 94, p. 1648, May 24, 1930. Barber, M. A.: Philippine Jour. of Sc. (Trop. Med.), vol. 9, p. 515 (1914).

[2] Italics not in original.

cases, while in the epidemics of the Northwest no severe illnesses occur and not a single fatal case has been reported.

The widespread distribution, the mode of transmission, the positive agglutination of the Shiga organism in two sera, and the general epidemiological features resemble bacillary dysentery more nearly than any other condition. On the other hand, the normal temperature, or very slight elevation of temperature, the short duration, and the mildness of attack in no way resemble dysentery, and more nearly resemble food infections; but on account of the simultaneous distribution of cases among widely separated groups of people and the continuation of cases over a considerable period of time, food spoilage as a common factor can be practically ruled out.

The above considerations, especially the definite agglutination of *B. dysenteriae* (Shiga), suggests the possibility that these epidemics are either mild outbreaks of bacillary dysentery, caused probably by an attenuated strain of the Shiga type of organism, or else an unknown organism belonging to the same group.

Why the condition does not spread to the large centers of population in the East remains unexplained.

SUMMARY

1. A mild dysentery-like epidemic with no deaths, occurring during the summer months in the northwestern United States, is described.
2. The mode of spread and distribution of cases closely resemble those epidemiological features of bacillary dysentery, but the symptoms and duration of the illness simulate conditions of food infections.
3. Second attacks were reported in 20 out of 95 cases recorded.
4. The sera of two out of six samples collected agglutinated *B. lysenteriae* (Shiga), but none of them agglutinated *B. dysenteriae* (Flexner), *B. paratyphosus* B., and *B. enteritidis*.

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES [1]

October 5–November 1, 1930

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized below. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of disease."

Poliomyelitis.—The number of cases of poliomyelitis reported during this period (1,641) is slightly lower than that for the preceding 4-week

[1] From the Office of Statistical Investigations, U. S. Public Health Service. The numbers of States included for the various diseases are as follows: Typhoid fever, 41; poliomyelitis, 35; meningococcus meningitis, 42; smallpox, 42; measles, 38; diphtheria, 42; scarlet fever, 41; influenza, 31.

period (1,837). This decline is, however, relatively slower than the decline last year at this season. The current incidence is 5.6 times as high as that for the corresponding period of last year, as compared with a similar ratio of 5.1 and 3.8 for the two 4-week periods immediately preceding the present one. The relative conditions during these periods for the two years are indicated by geographical sections, in the following table, which also shows that the South Central, West North Central, and the Western groups of States have, during the recent past, shown the sharpest increases over the 1929 incidence.

Poliomyelitis, by geographical sections

Region	Number of cases reported in 1929, 4 weeks ended—			Number of cases reported in 1930, 4 weeks ended—			Ratio of current incidence to incidence of corresponding 4 weeks of last year; period ended—		
	Sept. 7	Oct. 5	Nov. 2	Sept. 6	Oct. 4	Nov. 1	Sept. 6	Oct. 4	Nov. 1
North Atlantic [1]	155	190	129	320	449	382	2.1	2.4	3.0
South Atlantic	32	38	25	35	38	37	1.1	1.0	1.2
East North Central	53	61	65	118	284	262	1.2	4.7	4.0
West North Central	16	30	39	358	659	571	22.4	22.0	14.6
South Central [2]	20	10	9	97	83	63	4.9	8.3	14.9
Mountain and Pacific	33	29	25	254	324	326	7.6	11.2	13.4
All regions	309	358	292	1,182	1,837	1,641	3.8	5.1	5.6

[1] Includes the New England and Middle Atlantic group. The States included are shown in the tabular section of the Public Health Reports.
[2] Includes the East and West South Central groups.

Meningococcus meningitis.—The reported meningitis incidence has risen in successive 4-week periods from 256 cases to 291. This behavior is somewhat unexpected, for at this season meningitis usually undergoes a decline. The most abrupt increase occurred in Kansas, where the reported incidence jumped from an average of less than two cases per week to 23 cases during the week ended November 1. This type of rise is unusual. The only other section showing any marked increase is the South Central group of States, where the reported number of cases increased from 16 to 41 during the successive 4-week periods.

The incidence of 291 cases during the current period is less, however, than that of the corresponding period of 1929, when 363 cases were reported. The current incidence is exactly equal to that for the same period of 1928, but is above that of 1926 and 1927.

Scarlet fever.—The incidence of scarlet fever during the current 4-week period continues to be the lowest for this season during the last five years. The reported cases numbered 8,212, as compared with 9,271 during the corresponding period of last year and with 8,875 for 1928. There are, however, some indications that this favorable condition may be on the wane. During the four weeks ended August 9 the incidence was about 72 per cent of that for the corresponding period

of the preceding year. During the next two 4-week periods the ratio rose to 85 per cent and it now stands at 89 per cent.

Smallpox.—The number of cases of smallpox rose from 437 during the preceding period to 746 during the current period. The 1929 reports for corresponding periods showed a rise from 723 to 1,420 cases, so that the current incidence compares favorably with that of last year—in fact, it is probably as low as has been recorded at this time of the year.

Typhoid fever.—The incidence of typhoid fever declined to 2,724 cases during the period under report; during the preceding 4-week period 3,156 cases were reported. This decline is, however, slower than is usual at this season, and the incidence for the current period is about 42 per cent higher than that of the corresponding period of last year, whereas during the preceding period the 1930 excess was only about 24 per cent.

Measles.—The number of reported cases of measles, 3,670, is almost exactly twice the incidence of the preceding period, but such an increase is moderate for measles at this time of the year. Last year, for example, the figures for the corresponding periods were 4,882 and 2,188. The current situation is more favorable, in the light of the expectancy, than it has been in five years.

Influenza.—The influenza situation is also gratifying. The reported cases numbered 993, which is about two-thirds of last year's figure, and is the lowest level recorded for this period during recent years. Two years ago, the 1928–29 epidemic was in the making.

Diphtheria.—The diphtheria situation continues to be the most favorable on record. The reported cases numbered 5,851, as against 7,765 for the corresponding period last year.

Mortality, all causes.—The general death rate for this period, as reported by the Bureau of the Census, averaged 11.2 per thousand population (annual basis). This is a favorable rate. Last year at this time the rate was nearly 12.0, and in 1928 it was 11.7.

GUAYAQUIL, ECUADOR, DECLARED FREE FROM PLAGUE

In accordance with the provisions of Articles XI and XXXI of the Pan American Sanitary Code, which set forth the requirements to be fulfilled in order that a port may be designated "a clean port, class A," and provide for registering such place with the Pan American Sanitary Bureau, Guayaquil, Ecuador, has recently been officially declared "a clean port, class A," free from plague, by the Minister of Public Health and Social Welfare, Dr. Francisco J. Bolona. This declaration is based on a report by Dr. Luis M. Cueva, seaboard director of health, and Dr. John D. Long, traveling representative

of the Pan American Sanitary Bureau, indicating the success of the antiplague campaign in eliminating plague from Guayaquil and greatly reducing the incidence of the disease in the remainder of the country.

The following article is an extract of Doctor Long's report to the Pan American Sanitary Bureau regarding the antiplague campaign in Guayaquil and vicinity.

ANTIPLAGUE CAMPAIGN IN GUAYAQUIL AND VICINITY

Extracts from a report by Dr. JOHN D. LONG, *Representative of the Pan American Sanitary Bureau*

In June, 1929, the directing council of the Pan American Sanitary Bureau authorized, by resolution, the undertaking of epidemiological studies of bubonic plague in South America, with the proviso that such studies should begin in Ecuador on account of the fact that preliminary studies had indicated that, probably, some interesting discoveries might be made in the epidemiology of the disease.

In accordance with the terms of the resolution above referred to, and with the consent of the national health service of Ecuador, Dr. John D. Long, accompanied by Surg. C. R. Eskey, of the United States Public Health Service, who had been appointed epidemiologist, arrived in Guayaquil on August 25, 1929. Preliminary arrangements were made and active work was begun on September 18, 1929.

Bubonic plague gained entrance into the city of Guayaquil in 1908. Since that time it has been carried to the towns along the Guayaquil & Quito Railroad, and to the towns along some of the rivers. It has also been present at times in some of the coast cities. The coast cities are, however, now free, and have not had plague for several years. From the infected towns along the line of the railroad the disease spread to the Indian villages (caserios) and has existed in them in semisporadic form for some years. The Province of Loja, in the southern part of the country, was probably infected from Peru, as communication with other sections of Ecuador is very difficult, while there is constant communication with the border towns of Peru, and the disease is present on both sides of the border. On account of the difficulties which attend the transportation of personnel and supplies to Loja, nothing has been done in that Province as yet. Arrangements have been made, however, to begin active work there at the same time that work is being done in Peru. Danger of the reinfection of the cleaned up parts of Ecuador from Loja is believed to be very remote, on account of the transportation difficulties mentioned and the separation of Loja from the remainder of the country by a lofty chain of mountains.

As Guayaquil, in the 22 years that plague has been present there, has had over 7,200 cases of the disease, and as the type of construction in common use favors the breeding and harboring of rats, it seemed to be the most important point of first attack. Efforts were therefore devoted to that city from the beginning of the campaign in September until December. In December a trip of study and inspection was made into the interior of the country along the line of the railroad and to some of the near-by Indian villages.

PLAN OF THE CAMPAIGN IN GUAYAQUIL

Trapping of rats.—Trapping was resorted to for the double purpose of destroying as many rats as possible and obtaining rats for laboratory examination in order to have constant information as to the percentage of plague infection among them and to know when the plague had disappeared. For the purpose of reducing the rat population to as low a figure as possible, it was decided to resort to the use of poison on a large scale. The method of using the poison and the results obtained will be described later.

In round numbers 43,000 rats (excluding mice) have been trapped, approximately 60 per cent of which were examined. In November of 1929, 1 rat to each 150 examined was infected with plague. At the present time about 6,500 rats have been examined without finding any infection among them. The last plague rat was found March 26, 1930. It was 1 in 3,500 examined. In the beginning, with 1,400 traps, about 12 rats per 100 traps per day were caught. Later, with approximately 6,000 traps in daily use, about 3 rats per 100 traps per day were being caught—an apparent reduction in the rat population of 75 per cent. In the beginning the flea index per rat was as high as 12. This has dropped to 3—also an apparent reduction of 75 per cent. Approximately the same number of *rattus* and *alexandrinus*, as of Norway rats, are being caught, actually a few more *rattus* and *alexandrinus*. Experience here as well as in other cities shows that when the catch of Norway rats is reduced to the same number as that of *rattus* and *alexandrinus*, both human and rodent plague disappear. This balance between the various species of rats was reached about the 1st of April, 1930. The last human and the last rat cases were discovered on March 26, 1930.

Trapping was also carried on in the village of Duran (Eloy Alfaro), across the Guayas River from Guayaquil, the terminus of the Guayaquil & Quito Railroad. Results were not very satisfactory and no infected rats were found. Trapping was soon abandoned there, and poison has been continuously employed since.

Some trapping was done in some of the interior towns, such as Milagro, Ambato, and Huigra. As the results were not very satisfactory and but few rats were caught, the practice was soon abandoned

and poisoning substituted. Human cases of plague soon disappeared. Some trapping still continues in Ambato for the purpose of sending slides and specimens to the Quito laboratory in order to determine whether rat plague still exists.

It was decided that trapping is a useful measure for the purpose of obtaining rats for laboratory examination to determine the plague index among them, but that as an antiplague measure in the extermination of rats, its value is not great.

Poisoning of rats.—From the beginning of the campaign poison was used on a large scale, not only in the city of Guayaquil but in a number of small towns and cities as well, with very good results.

At first the poison used was composed of corn-meal flour, to which 35 per cent of barium chloride had been added, together with a very small quantity of ground cinnamon. While this gave good results, it was decided to experiment and determine whether a better poison could not be developed. After considerable experimenting it was found that there were two forms of poison that seemed to be best. The first consists of corn-meal flour to which had been added 18 per cent of white arsenic and 10 per cent of boneless codfish that had been run through a meat grinder. This mixture was wrapped in small paper packages by a group of small boys, the paper packages were placed in a barrel and sprayed, by means of a hand atomizer, with oil of anise, in sufficient quantity to produce a barely perceptible odor, and then mixed and thoroughly agitated to distribute evenly the oil of anise. If the oil of anise is too strong, the rats do not take the poison well. The second type of poison is the same as the first except that grated Parmesan cheese is substituted for the ground codfish, in the proportion of 5 per cent. When the rats apparently tire of one class of poison and do not seem to take it well, the other is substituted for a time, and in this way the efficiency is maintained. The cheese used is that which has been in the market for some time and is old, yellow, hard, and moldy, and can be bought very cheaply. It is grated by hand on an ordinary grater, producing a coarse sort of powder that can be handled very readily and that mixes well with the corn-meal flour base.

For the purpose of rat extermination chief dependence was placed upon the poison, and this later appeared justified. In the beginning the two inspectors who followed along behind the poisoners to observe the efficiency of the poison reported finding 1 poisoned rat for each 1.75 houses visited. This proportion steadily decreased until the inspectors reported 1 dead rat for each 12 houses visited—an apparent reduction of over 80 per cent as compared with 75 per cent shown by trapping statistics.

Poison operations in interior towns.—As human plague had appeared in the interior towns of Duran, Milagro, Huigra, Daule,

Nobol, and Colimes, in the coast zone, and in Ambato and some of the Indian villages of the mountain districts, it was decided to use poison on a large scale in these places and not attempt to do extensive trapping, for the reason that trapping is more expensive than poisoning, and besides there were no laboratory facilities at hand for rat examination.

The results were prompt and fulfilled expectations. Human plague ceased, as a rule, after the first poisoning, and the mortality among the rats was very high. Instructions were then given that all these places should be thoroughly poisoned once a month. As the towns are small, it requires only from two days to one week to place the poison throughout them, depending upon the size. At the time of this report human plague had not reappeared in any of the towns above mentioned.

It is not known how much poison has been placed in the towns and villages, as no strict record has been kept. It is of interest to state, however, that in the city of Guayaquil alone, in the course of about seven months, over 5 tons of the poison mixture previously described have been placed, and no serious accidents have occurred. It has been stated that a few pigs, chickens, and cats have been poisoned, but there is definite proof that this is unlikely. One small child was said to have been made sick by having eaten some barium chloride, but a talk with the father failed to elicit any information that would tend to confirm this. One woman was said to have eaten one of the packages of poison with suicidal intent, but her life was saved. There has been some resistance on the part of the public to the placing of the poison, but it has been overcome in every instance.

Not only from present experience but from previous experience it may be stated that the use of poison on a large scale, substantially in the manner described, is the most efficient way of destroying rats in cities, towns, and villages. Its use is not attended with serious danger, either to persons or animals, and its application is cheaper than trapping, for the reason that the work can be done with one-half the number of laborers, and expensive equipment, such as traps, bait, carts or trucks, bags, and tags, need not be purchased.

Estimate as to the number of rats destroyed in Guayaquil.—Guayaquil is said to have a population of 100,000. It is usually estimated that the average city has one rat for each inhabitant. Guayaquil must have had many more than this number, for the reason that most of the houses are constructed of light materials, such as bamboo side walls covered with mud or plaster stucco, wooden framing, and sides with double walls and partitions, and many of the houses rent out the ground floors as stores, many of which are food stores, groceries, food warehouses, etc.; and as in very few instances these articles are pro-

tected from rat depredations, it is believed that Guayaquil had a much larger rat population than most cities of its size.

The inspectors whose duty it was to report upon the efficiency of the poison usually reported about as many dead rats as were caught by the traps, and they frequently stated that they were convinced that, on the average, two rats died from the poison for each one found dead. They based this statement on the number of complaints that came from householders relative to bad odors resulting from dead rats between walls and partitions and under floors. (In the beginning of the campaign it was necessary to employ a young man whose sole duty consisted in answering telephone calls and in routing the disinfection gang that dug out these dead rats and disinfected or deodorized the place where they were found.) Also many householders told them of dead rats that had been found and buried, burned, or thrown into the garbage can. Taking all these factors into consideration, it is conservatively estimated that approximately three rats were destroyed by the poison for each one caught in the traps. If this estimate can be considered as fairly exact, it would appear that about 172,000 rats have been destroyed in the city of Guayaquil in a little over seven months.

Laboratory examination of rats.—The existing laboratory was utilized and with the addition of some more materials and equipment was found to be fairly adequate.

All rats delivered by the rat catchers to the laboratory that were in fit condition for autopsy, or were not used for flea studies, were examined. The method consisted in opening the rat completely after tacking it on a board, then making macroscopical examination and inoculating all suspicious rats into guinea pigs. All rats that were not considered suspicious had small pieces cut from their spleens and placed in a mortar, a small amount of salt solution was then added, and the mixture was at once inoculated into a separate guinea pig. This method was used in order to make sure that no plague among rats escaped observation. It was somewhat surprising soon to note that more infected rats were being found by means of the emulsion, or mass inoculation, than were found by inspection. An effort was made to correct this but it met with small success. The conclusion was finally forced that, in all probability, possibly due to acquired immunity from having been exposed to plague for 22 years,[1] the rats of Guayaquil had a form of plague that was apparently transmissible, though unrecognizable by macroscopic examination.

There was a small laboratory at Ambato where rats were autopsied, but as no facilities for microscopical examination existed all material was sent to Quito for examination in the laboratory there.

[1] Possibly due in some cases to the fact that the rats were trapped at a stage when the organisms were too few in number to be recognized in stained preparations or to produce gross lesions of the disease. — *Ed.*

Epidemiological observations made.—As Surgeon Eskey is making a complete epidemiological report,[2] a mere mention of some of the more important observations will be made here.

In Guayaquil the continued presence of plague has been due to a continuous epizootic among the rats. Three types of rats were found, viz, *Rattus norvegicus*, *Rattus rattus*, and *Rattus alexandrinus*. The prevalent flea (over 95 per cent) was the *L.* or *X. cheopis*.

In the cities of the coast zone the types of rats and fleas found were similar to those found in Guayaquil. In the mountain districts the problem was somewhat different. In these districts the disease existed principally in the Indian villages, with cases occasionally occurring in the towns; some of these either were infected in a village to take sick later in the town or were infected from the original case.

The disease was undoubtedly originally introduced into the mountain districts from the coast towns and cities through rats carried on the cars of the Guayaquil & Quito Railroad. On several occasions rats have been caught on these cars, and railroad employees state that they frequently see them, especially in cars loaded with rice, grain, and sugar, or other foodstuffs.

The disease is apparently transmitted from one Indian village to another through the agency of the Indians themselves, for the following reasons: It has been the custom among the Indians for many years, to hold wakes over their dead. The wake is usually held in the hut of the deceased and may last for several days. The attendants at the wake drink large quantities of "chicha," become intoxicated, and sleep on the floor of the hut. As there are infected fleas in the hut, the Indians either become infected or carry infected fleas with them in their clothing to their own villages to start a focus of the disease there. Seeming proof of this is found in the fact that many of the cases are preceded by an epizootic among the guinea pigs that are commonly kept (for food purposes) running around loose in the huts. It is a fairly common occurrence for all the guinea pigs in a hut to die soon after the Indian has returned from a wake, and soon after the guinea-pig mortality human cases occur.

Another possible factor in the transmission of the disease in the mountain districts is the occurrence of two unusual forms of the disease, both highly contagious and infectious. The one is known locally as "viruela pestosa" and is a manifestation of the septicemic form of the disease. It is characterized by a chicken-pox-like eruption composed of vesicles, filled with a straw-colored liquid, that rupture easily when touched. The liquid of these vesicles contains numerous plague bacilli, so that any one touching or handling a patient or a person dead with this form of the disease is extremely likely to become

[2] See PUBLIC HEALTH REPORTS, Sept. 5, 1930, p. 2077.—*Ed.*

infected. It is a common practice at wakes for the Indians to handle, caress, and wash the body of the deceased.

The other form of the disease is locally known as "angina pestosa" and is characterized by a violent form of tonsillitis and pharyngitis, with involvement of the cervical lymphatic glands. It is believed to be due to the custom, existing among the Indians, of killing with their teeth fleas that they find on their persons and clothing. It can readily be seen how infection could find lodgment in the crypts of the tonsils if one of the fleas so killed should be infected. This form of the disease is highly contagious and infectious, just as is the pneumonic type, through coughing and through the discharges from the mouth and nose.

So far as these investigations were concerned little was found to indicate that the rats play any great part in the spread of the disease in the mountain districts, except possibly as the agent which introduces and reintroduces infection from the coast cities and towns via the railroad.

Migrations of rats are known to occur in large numbers at certain seasons of the year. These migrations are coincident with the crop seasons. When the grain is ripening and about ready for the harvest, the rats leave the towns and villages and go to the fields. When the grain is harvested and stored in the houses and huts, the rats leave the fields and return to the villages. It has not been possible so far, however, to establish connection between these migrations and plague outbreaks. Data are hard to obtain from the Indians, and further study of this phenomenon is needed.

The measures recommended and being carried out in the Indian villages consist of periodical posioning to keep the rat population as low as possible, the early detection and isolation of cases, fumigation of huts for flea destruction, the prohibition of wakes in huts (especially huts for the holding of wakes, to be known as "casas de velorios," are being constructed) and better storing of grain and foodstuffs so as to protect them from rat depredations, and frequent visits of sanitary inspectors to all Indian villages.

To prevent reinfection of the mountain districts from the coast, and vice versa, a fumigation station has been established at Bucay, where all freight-carrying trains pass the night, and all loaded cars will be fumigated with Zyklon B for the purpose of rat and flea destruction. These cars no doubt carry fleas, as persons have been bitten during a ride of several hours in a freight car while sitting on top of the cargo.

SUMMARY

It is believed that, for all practical purposes, bubonic plague has been eliminated from Guayaquil and from the towns and villages

situated along the Guayas River and the line of the Guayaquil & Quito Railroad as far as Huigra, situated in the mountain district. It is realized, however, that in order to make sure that plague will not reappear, antiplague measures must be actively continued for one or two years more. This work is being done.

Plague still exists in sporadic form in the central mountain districts and in the Province of Loja. With the prevention of reinfection from the coast, and vice versa, through the systematic fumigation of railroad cars at Bucay, and with the constant application of the measures recommended, it is believed that the disease can be eliminated from the central mountain districts in a relatively short time at a reasonable cost. As the disease has never existed in this district except in sporadic form, its control should be fairly easy, especially in view of the epidemiological knowledge now available that was formerly not available. There is good reason to believe that the prevention of reinfection from the coast zone will in itself contribute greatly to the disappearance of the disease.

CONCLUSIONS

The port of Guayaquil is no longer a menace to other countries through international commerce. If by October 1, 1930, no further cases of human or rat plague shall have occurred, the port of Guayaquil may be reported to the Pan American Sanitary Bureau, in accordance with the terms of the Pan American Sanitary Code, as a "clean port" of class A, as when the regulation period of six months without plague shall have passed it will possess all the requisites that the treaty specifies.

The existence of plague in the interior Provinces, except in the case of the Province of Loja, which is in constant communication with Peru, has no international significance.

Complete and unselfish cooperation was extended by the officials and health authorities of Ecuador, who manifested great interest in this work, and valuable aid was given by their subordinates and employees.

MATERNAL MORTALITY IN THE BIRTH REGISTRATION AREA, 1929

The Department of Commerce announces that for the birth registration area the mortality rate for puerperal causes (7 per 1,000 live births) in 1929 was 0.5 higher than the rate (6.5) for 1927, the last year for which the summary was published. Puerperal septicemia increased less, the rate for 1927 having been 2.5, as compared with 2.6

in 1929, and the rate for "other puerperal causes" was lowered to 0.3 in 1929. These maternal rates are based on the number of deaths among women 15 to 45 years of age per 1,000 live births.

Confining the discussion to only three groups, namely, "all puerperal causes," "puerperal septicemia," and "other puerperal causes," it will be noted that of the 46 States for which data are available for 1929, South Carolina had the highest maternal mortality rate (11.4), with Alabama and Louisiana next in order (each 9.9), Florida (9.5), and Georgia (9.3). It must be borne in mind, however, that all the States with excessively high rates have large proportions of colored populations. The States with high rates from "puerperal septicemia" however, are Montana (4.2), Colorado (4), New Mexico (3.9), and Arizona (3.8), all with vast rural areas sparsely settled, where hospital facilities and skilled medical care are difficult to procure.

The rate for "accidents of pregnancy" was only 0.7 for the entire registration area, for "puerperal hemorrhage and other accidents of labor," 1.6, and for "puerperal albuminuria and convulsions," 1.8, while the rates in the States for the three causes, respectively, were highest for Vermont (1.3), Delaware (3), and South Carolina (4.7). Heretofore the total deaths from these three causes have been listed under "other puerperal causes."

Of the cities of 100,000 population in 1920, the highest rate for puerperal causes was for Memphis (16), followed by Nashville (14.7) and Birmingham (14.4). These three cities have large colored populations. For "accidents of pregnancy" and "puerperal hemorrhage and other accidents of labor," Memphis again takes the lead, with respective rates of 2.3 and 4.3 per 1,000 live births, while for "puerperal albuminuria and convulsions," New Orleans has the highest rate (4.4). The city with the highest rate for "puerperal septicemia" is Nashville (9), followed by Memphis (6.1) and Akron and Birmingham (each 5.7).

Certain cities which reached 100,000 population in the census of 1930 are included in the table, and for these the highest rate (14.1) for all puerperal causes is for Jacksonville, Fla., followed by Peoria (12.5), Chattanooga (11.9), Evansville (11.8), Knoxville (11.7), Fort Wayne (11), and Tulsa (10.8). Taking in order the last five causes on the table, the highest rate is for Jacksonville, Fla. (2.7), Chattanooga (3.3), Peoria (8.9), Knoxville (4), and Somerville (1.2).

Deaths from puerperal causes, with rates per 1,000 live births, in the birth registration area, 1929

Area	Deaths from puerperal causes, 1929											
	Number						Rate per 1,000 live births					
	The puerperal state	Accidents of pregnancy	Puerperal hemorrhage and other accidents of labor	Puerperal septicemia	Puerperal albuminuria and convulsions	Other puerperal causes	The puerperal state	Accidents of pregnancy	Puerperal hemorrhage and other accidents of labor	Puerperal septicemia	Puerperal albuminuria and convulsions	Other puerperal causes
The birth registration area in continental United States	15,084	1,530	3,368	5,718	3,821	647	7.0	0.7	1.6	2.6	1.8	0.3
STATE												
Alabama	620	52	126	208	216	18	9.9	.8	2.0	3.3	3.4	.3
Arizona	75	9	20	36	9	1	7.8	.9	2.1	3.8	.9	.1
Arkansas	341	29	71	127	111	3	9.1	.8	1.9	3.4	3.0	.1
California	461	54	108	195	86	18	5.7	.7	1.3	2.4	1.1	.2
Colorado	155	13	23	71	40	8	8.6	.7	1.3	4.0	2.2	.4
Connecticut	148	17	38	52	27	14	5.4	.6	1.4	1.9	1.0	.5
Delaware	27	2	13	6	5	1	6.3	.5	3.0	1.4	1.2	.2
Florida	255	23	56	84	84	8	9.5	.9	2.1	3.1	3.1	.3
Georgia	542	56	115	159	202	10	9.3	1.0	2.0	2.7	3.5	.2
Idaho	54	7	9	26	10	2	6.1	.8	1.0	3.0	1.1	.2
Illinois	874	119	188	343	187	37	6.8	.9	1.5	2.7	1.5	.3
Indiana	414	48	77	166	108	15	7.0	.8	1.3	2.8	1.8	.3
Iowa	235	29	41	87	60	18	5.6	.7	1.0	2.1	1.4	.4
Kansas	222	18	50	99	50	5	6.8	.6	1.5	3.0	1.5	.2
Kentucky	374	31	83	160	88	12	6.6	.5	1.5	2.8	1.6	.2
Louisiana	419	35	78	155	139	12	9.9	.8	1.9	3.7	3.3	.3
Maine	115	18	30	34	27	6	7.2	1.1	1.9	2.1	1.7	.4
Maryland	166	14	39	64	40	9	5.5	.5	1.3	2.1	1.3	.3
Massachusetts	499	55	140	179	90	35	6.7	.7	1.9	2.4	1.2	.5
Michigan	652	69	135	275	137	36	6.6	.7	1.4	2.8	1.4	.4
Minnesota	201	25	32	84	42	18	4.3	.5	.7	1.8	.9	.4
Mississippi	404	23	59	136	181	5	8.9	.5	1.3	3.0	4.0	.1
Missouri	445	45	93	214	83	10	7.3	.7	1.5	3.5	1.4	.2
Montana	84	6	17	42	18	1	8.4	.6	1.7	4.2	1.8	.1
Nebraska	163	12	29	89	22	11	6.1	.5	1.1	3.3	.8	.4
Nevada	8	-----	3	5	-----	-----	6.3	-----	2.3	3.9	-----	-----
New Hampshire	61	10	10	13	21	7	7.5	1.2	1.2	1.6	2.6	.9
New Jersey	373	45	102	147	59	20	5.5	.7	1.5	2.2	.9	.3
New Mexico	99	9	28	44	14	4	8.7	.8	2.5	3.9	1.2	.4
New York	1,216	142	349	427	228	70	5.6	.7	1.6	2.0	1.0	.3
North Carolina	651	44	154	149	281	23	8.4	.6	2.0	1.9	3.6	.3
North Dakota	80	4	19	32	22	3	5.5	.3	1.3	2.2	1.5	.2
Ohio	781	78	166	353	150	34	6.7	.7	1.4	3.0	1.3	.3
Oklahoma	327	31	74	124	87	11	8.2	.8	1.9	3.1	2.2	.3
Oregon	78	11	15	29	18	5	5.9	.8	1.1	2.2	1.4	.4
Pennsylvania	1,232	141	287	508	240	56	6.5	.7	1.5	2.7	1.3	.3
Rhode Island	97	11	17	43	18	8	7.9	.9	1.4	3.5	1.5	.7
South Carolina	450	25	111	121	185	8	11.4	.6	2.8	3.1	4.7	.2
Tennessee	440	51	103	169	103	14	8.7	1.0	2.0	3.3	2.0	.3
Utah	61	13	17	16	12	3	4.9	1.1	1.4	1.3	1.0	.2
Vermont	52	9	8	17	14	4	7.7	1.3	1.2	2.5	2.1	.6
Virginia	381	38	86	127	113	17	7.1	.7	1.6	2.4	2.1	.3
Washington	140	10	34	63	31	2	6.2	.4	1.5	2.8	1.4	.1
West Virginia	237	17	54	94	59	13	5.8	.4	1.3	2.3	1.5	.3
Wisconsin	285	19	44	114	79	29	5.1	.3	.8	2.1	1.4	.5
Wyoming	28	4	5	10	6	3	6.3	.9	1.1	2.3	1.4	.7

Deaths from puerperal causes, with rates per 1,000 live births, in cities of 100,000 or more population in the birth registration area, 1929

Area	Deaths from puerperal causes, 1929											
	Number						Rate per 1,000 live births					
	The puerperal state	Accidents of pregnancy	Puerperal hemorrhage and other accidents of labor	Puerperal septicemia	Puerperal albuminuria and convulsions	Other puerperal causes	The puerperal state	Accidents of pregnancy	Puerperal hemorrhage and other accidents of labor	Puerperal septicemia	Puerperal albuminuria and convulsions	Other puerperal causes
Cities of 100,000 population or more in 1930:[1]	4,621	495	1,080	1,984	873	189	7.0	0.8	1.6	3.0	1.3	0.3
CITY												
Akron	51	3	9	32	5	2	9.0	.5	1.6	5.7	.9	.4
Albany	12	2	5	4	1	----	4.7	.8	2.0	1.6	.4	----
Atlanta	49	5	11	17	14	2	9.6	1.0	2.2	3.3	2.7	.4
Baltimore	87	11	19	33	19	5	5.8	.7	1.3	2.2	1.3	.3
Birmingham	78	7	22	31	17	1	14.4	1.3	4.1	5.7	3.1	.2
Boston	128	14	46	50	9	9	7.1	.8	2.6	2.8	.5	.5
Bridgeport	19	2	5	6	3	3	6.2	.7	1.6	2.0	1.0	1.0
Buffalo	92	12	29	33	11	7	7.9	1.0	2.5	2.8	.9	.6
Cambridge	16	1	5	6	3	1	6.2	.4	1.9	2.3	1.2	.4
Camden	21	3	4	10	4	----	7.1	1.0	1.3	3.4	1.3	----
Canton	14	1	3	7	3	----	7.2	.5	1.5	3.6	1.5	----
Chattanooga	25	3	7	7	8	----	11.9	1.4	3.3	3.3	3.8	----
Chicago	382	49	97	158	68	10	6.5	.8	1.6	2.7	1.2	.2
Cincinnati	74	2	15	39	17	1	8.4	.2	1.7	4.4	1.9	.1
Cleveland	117	11	26	49	20	11	6.7	.6	1.5	2.8	1.1	.6
Columbus	42	3	12	16	9	2	7.9	.6	2.3	3.0	1.7	.4
Dayton	39	1	8	19	11	----	11.2	.3	2.3	5.4	3.2	----
Denver	46	4	8	22	10	2	9.6	.8	1.7	4.6	2.1	.4
Des Moines	20	2	4	11	3	----	7.1	.7	1.4	3.9	1.1	----
Detroit	240	27	45	120	38	10	7.1	.8	1.3	3.5	1.1	.3
Duluth	7	----	----	6	1	----	3.6	----	----	3.1	.5	----
Elizabeth	17	4	3	7	2	1	6.6	1.6	1.2	2.7	.8	.4
Erie	15	1	3	7	3	1	6.3	.4	1.3	2.9	1.3	.4
Evansville	20	4	4	8	4	----	11.8	2.4	2.4	4.7	2.4	----
Fall River	19	2	4	8	3	2	8.4	.9	1.8	3.5	1.3	.9
Flint	42	4	12	18	6	2	9.5	.9	2.7	4.1	1.4	.5
Fort Wayne	23	4	2	11	5	1	11.0	1.9	1.0	5.2	2.4	.5
Gary	19	1	3	10	5	----	8.9	.5	1.4	4.7	2.3	----
Grand Rapids	20	2	2	9	6	1	5.8	.6	.6	2.6	1.7	.3
Hartford	19	1	4	9	3	2	4.6	.2	1.0	2.2	.7	.5
Indianapolis	64	8	11	23	21	1	9.2	1.2	1.6	3.3	3.0	.1
Jacksonville, Fla	37	7	5	15	8	2	14.1	2.7	1.9	5.7	3.1	.8
Jersey City	27	3	7	14	3	----	4.5	.5	1.2	2.3	.5	----
Kansas City, Kans	13	----	5	5	3	----	5.8	----	2.2	2.2	1.3	----
Kansas City, Mo	53	1	6	33	10	3	8.5	.2	1.0	5.3	1.6	.5
Knoxville	26	2	4	11	9	----	11.7	.9	1.8	4.9	4.0	----
Long Beach	13	3	3	6	----	1	6.3	1.5	1.5	2.9	----	.5
Los Angeles	110	10	24	57	18	1	6.4	.6	1.4	3.3	1.0	.1
Louisville	39	1	8	21	7	2	6.4	.2	1.3	3.5	1.2	.3
Lowell	19	2	6	6	5	----	9.7	1.0	3.0	3.0	2.5	----
Lynn	16	4	6	3	2	1	8.6	2.1	3.2	1.6	1.1	.5
Memphis	71	10	19	27	13	2	16.0	2.3	4.3	6.1	2.9	.5
Miami	16	2	3	6	4	1	8.4	1.0	1.6	3.1	2.1	.5
Milwaukee	62	8	11	27	9	7	5.2	.7	.9	2.3	.8	.6
Minneapolis	38	6	7	16	6	3	4.8	.8	.9	2.0	.8	.4
Nashville	49	5	4	30	7	3	14.7	1.5	1.2	9.0	2.1	.9
Newark, N. J	64	10	19	27	6	2	6.4	1.0	1.9	2.7	.6	.2
New Bedford	14	1	5	6	2	----	6.9	.5	2.5	3.0	1.0	----
New Haven	26	2	8	9	6	1	7.7	.6	2.4	2.7	1.8	.3
New Orleans	109	6	9	52	41	1	11.6	.6	1.0	5.5	4.4	.1
New York	645	78	192	226	108	41	5.2	.6	1.5	1.8	.9	.3
Norfolk	17	4	1	11	1	----	7.4	1.7	.4	4.8	.4	----
Oakland	13	1	2	9	1	----	3.1	.2	.5	2.1	.2	----
Oklahoma City	28	6	4	9	8	1	9.7	2.1	1.4	3.1	2.8	.3
Omaha	34	4	5	18	5	2	7.9	.9	1.2	4.2	1.2	.5
Paterson	22	5	4	7	6	----	7.4	1.7	1.3	2.3	2.0	----
Peoria	24	----	2	17	5	----	12.5	----	1.0	8.9	2.6	----

[1] The population of these cities in 1929 formed 30.3 per cent of the estimated population of the birth registration area.

Deaths from peurperal causes, with rates per 1,000 live births, in cities of 100,000 or more population in the birth registration area, 1929—Continued

Area	Deaths from puerperal causes, 1929											
	Number						Rate per 1,000 live births					
	The puerperal state	Accidents of pregnancy	Puerperal hemorrhage and other accidents of labor	Puerperal septicemia	Puerperal albuminuria and convulsions	Other puerperal causes	The puerperal state	Accidents of pregnancy	Puerperal hemorrhage and other accidents of labor	Puerperal septicemia	Puerperal albuminuria and convulsions	Other puerperal causes
CITY—Continued												
Philadelphia	258	31	63	97	57	10	7.4	0.9	1.8	2.8	1.6	0.3
Pittsburgh	125	15	28	55	24	3	8.5	1.0	1.9	3.7	1.6	.2
Portland, Oreg	24	1	5	9	7	2	5.7	.2	1.2	2.1	1.7	.5
Providence	57	7	8	29	10	3	10.1	1.2	1.4	5.2	1.8	.5
Reading	16	-----	2	9	5	-----	9.1	-----	1.1	5.1	2.8	-----
Richmond	35	3	9	14	7	2	9.7	.8	2.5	3.9	1.9	.6
Rochester	31	-----	10	11	10	-----	5.3	-----	1.7	1.9	1.7	-----
St. Louis	93	9	17	55	11	1	6.2	.6	1.1	3.7	.7	.1
St. Paul	26	5	4	12	2	3	5.0	1.0	.8	2.3	.4	.6
Salt Lake City	20	3	6	6	5	-----	6.1	.9	1.8	1.8	1.5	-----
San Diego	10	1	2	5	1	1	4.0	.4	.8	2.0	.4	.4
San Francisco	50	7	15	18	9	1	6.5	.9	2.0	2.3	1.2	.1
Scranton	27	-----	6	13	7	1	9.8	-----	2.2	4.7	2.5	.4
Seattle	25	1	6	10	8	-----	4.8	.2	1.2	1.9	1.5	-----
Somerville	15	1	4	8	-----	2	9.1	.6	2.4	4.9	-----	1 2
South Bend	15	1	3	4	7	-----	7.3	.5	1.5	1.9	3.4	-----
Spokane	14	1	2	7	3	1	7.0	.5	1.0	3 5	1.5	.5
Springfield, Mass	21	-----	5	13	2	1	6.9	-----	1.6	4.3	.7	.3
Syracuse	28	5	9	11	2	1	6.6	1.2	2.1	2.6	.5	.2
Tacoma	11	1	1	7	2	-----	5.8	.5	.5	3.7	1.0	-----
Tampa	8	-----	3	3	2	-----	4.2	-----	1.6	1.6	1.1	-----
Toledo	54	1	13	29	10	1	9.5	.2	2.3	5.1	1.8	.2
Trenton	24	3	7	10	4	-----	8.8	1.1	2.6	3.7	1.5	-----
Tulsa	24	4	2	14	4	-----	10.8	1.8	.9	6.3	1.8	-----
Utica	11	1	2	5	1	2	5.9	.5	1.1	2.7	.5	1.1
Washington, D. C	62	9	12	22	19	-----	7.0	1.0	1.3	2.5	2.1	-----
Waterbury	18	1	5	7	4	1	8.4	.5	2.3	3.3	1.9	.5
Wichita	21	2	6	10	2	1	9.6	.9	2.7	4.6	.9	.5
Wilmington, Del	18	1	9	5	3	-----	8.3	.5	4.2	2.3	1.4	-----
Worcester	33	3	7	13	10	-----	8.8	.8	1.9	3.5	2.7	-----
Yonkers	13	1	3	6	3	-----	5.9	.5	1.4	2.7	1.4	-----
Youngstown	32	2	9	13	7	1	8.8	.5	2.5	3.6	1.9	.3

DEATHS DURING WEEK ENDED NOVEMBER 1, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended November 1, 1930, and corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

	Week ended Nov. 1, 1930	Corresponding week, 1929
Policies in force	75, 382, 865	75, 003, 699
Number of death claims	13, 628	13, 901
Death claims per 1,000 policies in force, annual rate	9. 4	9. 7

Deaths [1] from all causes in certain large cities of the United States during the week ended November 1, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Nov. 1, 1930				Corresponding week 1929		Death rate [2] for first 44 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (78 cities)	7,749	11.7	711	[4] 57	12.0	640	11.9	12.7
Akron	39	8.0	5	46	10.8	8	8.0	9.4
Albany [5]	40	16.3	2	41	14.0	2	14.7	16.4
Atlanta	69	13.4	7	72	15.9	4	15.9	16.1
White	37		3	48		2		
Colored	32	(6)	4	115	(6)	2	(6)	(6)
Baltimore [5]	242	15.7	32	111	13.2	18	14.0	14.7
White	177		22	98		10		
Colored	65	(6)	10	160	(6)	8	(6)	(6)
Birmingham	70	14.1	8	77	13.0	5	13.7	16.1
White	36		5	79		2		
Colored	34	(6)	3	73	(6)	3	(6)	(6)
Boston	194	12.9	21	61	15.5	17	14.1	15.1
Bridgeport	23	8.1	1	17	7.1	1	10.9	12.1
Buffalo	152	13.8	17	76	14.8	7	13.0	14.1
Cambridge	21	9.6	2	40	8.3	1	11.9	12.5
Camden	39	17.4	5	88	13.8	1	13.6	14.6
Canton	17	8.4	1	27	9.0	2	10.0	11.3
Chicago [5]	671	10.3	51	45	11.0	56	10.4	11.3
Cincinnati	134	15.5	11	65	16.0	9	15.6	17.2
Cleveland	183	10.6	17	51	11.0	21	11.1	12.5
Columbus	83	14.9	6	59	16.2	7	15.6	14.9
Dallas	69	13.7	8		9.0	2	11.4	11.5
White	61		7			1		
Colored	8	(6)	1		(6)	1	(6)	(6)
Dayton	37	9.6	1	15	11.1	2	10.7	11.6
Denver	86	15.5	2	22	15.0	10	14.8	14.9
Des Moines	32	11.7	4	74	9.2	2	11.7	11.6
Detroit	260	8.6	38	58	9.2	36	9.3	11.2
Duluth	32	16.5	2	54	7.2	0	11.5	11.5
El Paso	31	15.8	5		10.4	3	17.3	19.6
Erie	24	10.8	3	66	6.8	1	11.2	12.2
Fall River [5] [7]	22	10.0	0	0	10.9	3	11.8	13.7
Flint	29	9.6	4	47	12.3	5	9.2	10.8
Fort Worth	21	7.7	0		8.9	1	11.0	12.2
White	20		0			0		
Colored	4	(6)	0		(6)	1	(6)	(6)
Grand Rapids	30	9.3	1	15	10.3	2	10.2	10.2
Houston	66	11.8	11		12.4	5	12.2	12.7
White	43		8			5		
Colored	23	(6)	3		(6)	0	(6)	(6)
Indianapolis	103	14.7	9	68	15.5	13	14.6	14.8
White	83		6	52		11		
Colored	20	(6)	3	175	(6)	2	(6)	(6)
Jersey City	63	10.4	5	43	10.6	5	11.3	12.5
Kansas City, Kans	23	9.8	1	23	9.0	1	11.7	13.0
White	16		1	28		1		
Colored	7	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo	107	14.1	7	59	13.6	9	13.5	14.0
Knoxville	17	8.3	3	70	13.6	1	13.5	14.0
White	13		3	78		1		
Colored	4	(6)	0	0	(6)	0	(6)	(6)
Los Angeles	269	11.3	17	51	9.7	16	11.0	11.3
Louisville	66	11.2	6	51	29.8	8	13.6	15.3
White	56		6	59		6		
Colored	10	(6)	0	0	(6)	2	(6)	(6)
Lowell [7]	21	10.9	1	26	10.8	3	13.4	14.1
Lynn	18	9.2	2	56	8.7	3	10.4	11.3
Memphis	83	17.1	11	129	17.6	8	17.1	19.1
White	40		4	72		1		
Colored	43	(6)	7	235	(6)	7	(6)	(6)
Milwaukee	95	8.7	8	35	11.7	19	9.8	11.1
Minneapolis	107	12.0	17	112	9.9	6	10.7	10.8

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended November 1, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)—Continued.

City	Week ended Nov. 1, 1930				Corresponding week 1929		Death rate [2] for first 44 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [4]	Deaths under 1 year	1930	1929
Nashville	46	16.3	7	110	12.4	2	17.3	18.7
White	30		4	84		1		
Colored	16	(6)	3	186	(6)	1	(6)	(6)
New Bedford [7]	28	12.9	1	26	13.8	0	10.9	12.2
New Haven	47	15.1	1	15	12.8	1	12.7	13.5
New Orleans	152	17.3	19	106	17.9	8	17.5	17.7
White	87		12	102		5		
Colored	65	(6)	7	113	(6)	3	(6)	(6)
New York	1,426	10.6	121	51	10.7	109	10.7	11.4
Bronx Borough	212	8.6	17	49	8.6	16	7.9	8.3
Brooklyn Borough	460	9.2	46	48	9.7	44	9.7	10.3
Manhattan Borough	591	16.7	47	60	14.6	34	16.1	16.5
Queens Borough	131	6.2	10	40	7.7	13	7.0	7.6
Richmond Borough	32	10.5	1	19	15.2	2	14.3	16.0
Newark, N. J	92	10.8	5	26	12.7	10	11.9	12.8
Oakland	69	12.6	7	87	9.0	3	11.0	11.3
Oklahoma City	26	7.3	2	36	9.2	2	10.8	10.8
Omaha	53	12.9	5	61	9.1	2	13.5	13.6
Paterson	38	14.3	3	52	15.5	3	12.3	13.4
Philadelphia	482	12.8	52	77	11.6	34	12.5	13.2
Pittsburgh	180	14.0	18	64	14.5	28	13.8	14.8
Portland, Oreg	65	11.3	0	0	12.7	3	12.2	12.7
Providence	51	10.6	4	37	15.2	6	12.9	14.6
Richmond	60	17.1	10	145	16.3	2	14.8	16.3
White	28		2	44		1		
Colored	32	(6)	8	342	(6)	1	(6)	(6)
Rochester	70	11.2	2	18	11.8	6	11.6	12.4
St. Louis	214	13.6	13	45	14.0	15	14.1	14.7
St. Paul	46	8.8	2	20	7.6	1	10.1	10.5
Salt Lake City [5]	41	15.2	7	111	12.4	4	12.4	13.0
San Antonio	47	9.5	6		15.8	7	14.7	14.5
San Diego	35	12.2	2	42	13.1	0	14.4	15.1
San Francisco	111	9.2	2	14	13.7	10	13.0	13.1
Schenectady	21	11.4	2	62	15.3	3	11.2	12.3
Seattle	84	12.0	9	91	13.0	6	10.9	11.2
Somerville	13	6.5	1	32	7.1	0	9.7	9.2
Spokane	34	15.3	3	78	9.5	2	12.5	12.8
Springfield, Mass	32	11.1	6	103	7.7	1	12.1	12.8
Syracuse	31	7.8	5	62	9.7	2	11.7	13.1
Tacoma	32	15.6	2	55	8.8	2	12.5	11.8
Toledo	69	12.3	10	92	14.8	9	12.7	13.7
Trenton	30	12.7	3	58	14.1	4	16.7	17.1
Utica	32	16.2	1	28	10.7	3	14.7	15.6
Washington, D. C	154	16.5	17	100	15.9	7	15.1	15.4
White	101		10	87		3		
Colored	53	(6)	7	125	(6)	4	(6)	(6)
Waterbury	13	6.7	2	49	9.3	2	9.4	9.5
Wilmington, Del. [7]	26	12.9	5	121	11.4	1	14.6	13.9
Worcester	45	11.9	1	14	13.6	7	12.6	12.7
Yonkers	26	10.0	0	0	9.8	4	8.1	9.3
Youngstown	37	11.3	3	43	15.3	8	10.3	12.4

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended November 8, 1930, and November 9, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 8, 1930, and November 9, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929
New England States:								
Maine	1	9		6	66	43	1	0
New Hampshire	1	1				2	0	0
Vermont	5	2			3	1	0	0
Massachusetts	67	123	2	5	78	105	3	2
Rhode Island	10	15	1	4			0	0
Connecticut	6	19	7	1	55	3	3	3
Middle Atlantic States:								
New York	74	151	[1] 11	[1] 10	71	181	12	10
New Jersey	62	143	16	8	71	16	2	5
Pennsylvania	132	175			109	219	4	5
East North Central States:								
Ohio	65	41	1	8	25	159	3	3
Indiana	55	53	2		28	20	3	0
Illinois	180	220	6	12	46	138	3	6
Michigan	85	80	3		40	157	4	11
Wisconsin	13	27	26	25	41	194	2	3
West North Central States:								
Minnesota	14	34		1	6	69	1	0
Iowa	16	6			2	37	1	1
Missouri	47	76	2		137	31	3	5
North Dakota	11	5			7	9	6	0
South Dakota	8	11				5	0	0
Nebraska	13	11		8	5	21	1	0
Kansas	10	41		5	3	40	1	2
South Atlantic States:								
Delaware	5	3					0	0
Maryland [2]	31	28	17	6	6	7	1	1
District of Columbia	9	11	1		3	1	1	2
West Virginia	36	45	11	8	26	14	0	1
North Carolina	154	228	8	5	9	2	2	2
South Carolina	63	71	498	591			0	0
Georgia	26	24	67	49	3	4	0	0
Florida	22	14		1	6		0	0
East South Central States:								
Kentucky		39					5	2
Tennessee	57	37	35	56	3	34	2	1
Alabama	34	60	27	50	28	13	3	0
Mississippi	92	68					2	0

[1] New York City only.
[2] Week ended Friday.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 8, 1930, and November 9, 1929*—Continued**

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929
West South Central States:								
Arkansas	21	26	12	23	4	1	0	5
Louisiana	45	41	23	14	1		1	0
Oklahoma [1]	48	105	24	48	10	32	1	3
Texas	94	85	69	43	8	107	0	0
Mountain States:								
Montana	1					146	1	1
Idaho	1				3	12	2	0
Wyoming	2						0	0
Colorado	14	7			215	3	0	1
New Mexico	6	8			7	1	1	0
Arizona	13	25	2	16	39	1	1	8
Utah [2]	3	2	10	4	3	1	0	4
Pacific States:								
Washington	22	16		3	5	44	3	2
Oregon	3	21	10	15	40	9	0	1
California	85	77	29	56	109	65	3	2

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929
New England States:								
Maine	5	0	18	32	0	0	7	9
New Hampshire	1	0	8	14	0	0	1	3
Vermont	0	0	6	22	3	2	0	0
Massachusetts	13	2	153	235	0	0	5	13
Rhode Island	0	0	15	16	0	0	2	0
Connecticut	2	1	32	57	0	0	9	3
Middle Atlantic States:								
New York	20	10	281	199	0	18	26	23
New Jersey	2	2	119	124	0	0	80	9
Pennsylvania	5	3	345	183	0	1	30	44
East North Central States:								
Ohio	43	2	288	131	15	84	41	21
Indiana	4	2	146	126	41	91	12	7
Illinois	19	2	339	456	25	88	15	20
Michigan	10	1	171	227	15	60	19	10
Wisconsin	7	1	86	77	6	28	5	11
West North Central States:								
Minnesota	26	1	53	95	10	5	3	4
Iowa	4	4	53	32	5	48	8	11
Missouri	8	0	99	93	11	22	34	6
North Dakota	3	0	20	20	19	21	4	2
South Dakota	5	0	6	12	13	21	3	0
Nebraska	12	0	20	19	15	12	0	0
Kansas	13	0	41	116	11	7	9	8
South Atlantic States:								
Delaware	0	0	10	4	0	0	1	2
Maryland [2]	2	2	43	73	0	0	21	18
District of Columbia	0	0	20	12	0	0	3	1
West Virginia	4	0	50	78	0	5	40	23
North Carolina	3	1	178	139	0	1	11	11
South Carolina	0	1	25	28	3	0	26	26
Georgia	0	1	38	34	0	0	23	5
Florida	0	0	7	6	0	0	1	1
East South Central States:								
Kentucky	2	1	114	85	0	7	34	17
Tennessee	0	0	62	53	1	0	17	14
Alabama	8	1	63	66	2	1	8	9
Mississippi	1	0	34	38	0	0	37	20
West South Central States:								
Arkansas	0	0	15	31	4	1	26	8
Louisiana	1	0	21	24	0	0	9	13
Oklahoma [1]	1	1	28	68	1	16	29	25
Texas	12	0	40	53	6	8	30	8

[2] Week ended Friday.

[1] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 8, 1930, and November 9, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929	Week ended Nov. 8, 1930	Week ended Nov. 9, 1929
Mountain States:								
Montana	2	0	11	49	2	10	1	7
Idaho	0	0	10	8	0	7	3	0
Wyoming	0	0	4	2	0	3	0	1
Colorado	4	0	26	26	2	43	3	6
New Mexico	3	0	7	10	0	1	10	4
Arizona	0	0	5	11	0	1	3	9
Utah [2]	0	0	15	12	1	0	0	0
Pacific States:								
Washington	1	2	48	43	10	35	10	9
Oregon	1	2	17	40	6	10	2	3
California	49	3	107	179	9	18	18	12

[2] Week ended Friday.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September, 1930										
Kansas	7	45	2		20		275	131	10	46
Texas	2	76	43	1,051			19	38		55
October, 1930										
Arizona	7	46	10		84		6	29	8	25
Connecticut	1	43	14		73		33	65	0	31
Indiana	16	201	30		40		55	336	76	62
Iowa	3	44		1	8		75	170	44	15
Nebraska	3	52	6		42		136	107	30	15
Wyoming		2	6				18	22	1	3

September, 1930 — Cases

Chicken pox:
- Kansas — 30

German measles:
- Kansas — 2

Impetigo contagiosa:
- Kansas — 2

Lethargic encephalitis:
- Kansas — 1

Mumps:
- Kansas — 27

Paratyphoid fever:
- Kansas — 3
- Texas — 3

Scabies:
- Kansas — 16

Septic sore throat:
- Kansas — 1

Tetanus:
- Kansas — 8

Undulant fever:
- Kansas — 6

Vincent's angina:
- Kansas — 2

Whooping cough:
- Kansas — 107

October, 1930

Anthrax:
- Connecticut — 1

Chicken pox:
- Arizona — 5
- Connecticut — 82
- Indiana — 135
- Iowa — 103
- Nebraska — 71
- Wyoming — 63

Conjunctivitis, infectious:
- Connecticut — 2

Dysentery:	Cases
Arizona	2
Connecticut (amebic)	1
Connecticut (bacillary)	3
Iowa	3
German measles:	
Iowa	3
Impetigo contagiosa:	
Iowa	1
Lead poisoning:	
Connecticut	2
Lethargic encephalitis:	
Connecticut	1
Nebraska	1
Mumps:	
Arizona	16
Connecticut	32
Indiana	5
Iowa	28
Nebraska	18
Wyoming	9
Paratyphoid fever:	
Connecticut	2

Rabies in animals:	Cases
Connecticut	5
Septic sore throat:	
Connecticut	7
Wyoming	3
Tetanus:	
Connecticut	1
Trachoma:	
Arizona	113
Indiana	1
Undulant fever:	
Arizona	1
Connecticut	1
Iowa	8
Vincent's angina:	
Iowa	2
Whooping cough:	
Arizona	23
Connecticut	155
Indiana	57
Iowa	23
Nebraska	45
Wyoming	18

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,575,000. The estimated population of the 89 cities reporting deaths is more than 29,980,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended November 1, 1930, and November 2, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,790	2,428	
96 cities	563	846	1,073
Measles:			
45 States	1,499	1,676	
96 cities	370	226	
Meningococcus meningitis:			
46 States	92	99	
96 cities	32	40	
Poliomyelitis:			
46 States	504	79	
Scarlet fever:			
46 States	2,988	3,224	
96 cities	1,002	912	858
Smallpox:			
46 States	252	628	
96 cities	20	81	11
Typhoid fever:			
46 States	697	502	
96 cities	87	66	73
Deaths reported			
Influenza and pneumonia:			
89 cities	629	647	
Smallpox:			
89 cities	0	0	

City reports for week ended November 1, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid, fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	4	1	0		0	0	0	1
New Hampshire:								
Concord		0						
Nashua	1	0	1		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	1	0		0	0	0	0
Massachusetts:								
Boston	48	30	19		0	25	3	23
Fall River	4	3	1		0	0	1	1
Springfield	13	5	8		0	0	4	2
Worcester	11	6	6		0	2	1	2
Rhode Island:								
Pawtucket	3	1	1		0	0	0	0
Providence	6	9	2		0	0	0	5
Connecticut:								
Bridgeport	1	5	0	1	1	0	0	3
Hartford	3	5	1		0	27	0	2
New Haven	1	1	0		0	2	8	4
MIDDLE ATLANTIC								
New York:								
Buffalo		15						
New York	48	145	43	7	6	38	12	143
Rochester	4	4	5		0	1	0	5
Syracuse	17	4	0		0	1	0	0
New Jersey:								
Camden	0	9	2	1	1	8	4	6
Newark	4	14	9	5	0	0	4	7
Trenton	2	2	4		0	0	0	4
Pennsylvania:								
Philadelphia	37	61	16	10	6	7	14	28
Pittsburgh	25	26	15		6	2	5	27
Reading	0	3	1		0	0	3	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	2	12	4		1	1	2	11
Cleveland	57	55	16	5	0	3	23	17
Columbus	15	6	2	2	1	0	0	4
Toledo	29	10	9		0	2	2	6
Indiana:								
Fort Wayne	3	5	0		2	1	0	1
Indianapolis	11	13	3		1	3	3	16
South Bend	7	2	7		0	1	0	4
Terre Haute	0	2	0		0	0	0	3
Illinois:								
Chicago	53	129	113	9	2	8	39	51
Springfield	0	1	6		0	1	0	3
Michigan:								
Detroit	66	68	55	3	3	3	7	23
Flint	14	6	0		0	4	1	3
Grand Rapids	0	3	0		0	0	0	0

City reports for week ended November 1, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	19	2	0	----------	0	1	3	0
Madison	3	2	0	----------	----------	1	7	----------
Milwaukee	54	19	3	----------	0	3	14	2
Racine	17	2	0	----------	0	0	0	1
Superior	2	1	0	----------	0	0	0	2
WEST NORTH CENTRAL								
Minnesota:								
Duluth	25	0	2	----------	0	0	0	2
Minneapolis	20	34	2	----------	2	1	3	10
St. Paul	31	12	4	----------	1	0	0	4
Iowa:								
Davenport	2	1	6	----------	----------	0	0	----------
Des Moines	2	4	1	----------	----------	0	0	----------
Sioux City	8	3	2	----------	----------	0	3	----------
Waterloo	4	1	0	----------	----------	0	2	----------
Missouri:								
Kansas City	14	10	12	----------	0	0	0	5
St. Joseph	1	2	0	----------	0	0	0	2
St. Louis	14	45	13	----------	----------	149	7	----------
North Dakota:								
Fargo	11	0	0	----------	0	0	0	0
Grand Forks	1	0	0	----------	----------	0	1	----------
South Dakota:								
Sioux Falls	0	0	0	----------	----------	0	0	----------
Nebraska:								
Omaha	8	14	11	----------	0	1	0	2
Kansas:								
Topeka	0	2	1	----------	0	1	0	3
Wichita	1	4	1	----------	0	0	0	4
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	3	0	----------	0	0	0	2
Maryland:								
Baltimore	25	27	8	8	3	2	4	24
Cumberland	0	1	0	----------	0	0	0	0
Frederick	0	1	2	----------	0	0	0	0
District of Columbia:								
Washington	2	19	3	3	3	3	0	8
Virginia:								
Lynchburg	3	5	2	----------	0	0	0	0
Norfolk	1	3	1	----------	0	0	2	0
Richmond	0	21	8	----------	2	1	0	6
Roanoke	1	6	5	----------	0	0	2	0
West Virginia:								
Charleston	1	3	3	----------	0	0	4	2
Wheeling	9	1	0	----------	0	0	0	4
North Carolina:								
Raleigh	0	4	2	----------	0	0	0	2
Wilmington	0	1	2	----------	1	0	0	2
Winston-Salem	5	6	5	----------	0	0	0	2
South Carolina:								
Charleston	0	1	2	5	0	0	0	1
Columbia	1	2	2	----------	0	0	2	4
Greenville	0	2	0	----------	0	0	0	0
Georgia:								
Atlanta	2	10	9	30	0	1	0	7
Brunswick	0	0	0	----------	0	0	0	0
Savannah	0	3	3	4	0	0	0	3
Florida:								
Miami	0	2	4	2	0	2	0	1
St. Petersburg	----------	0	----------	----------	0	----------	----------	0
Tampa	0	2	2	----------	0	3	0	0

City reports for week ended November 1, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	3	1		0	0	0	0
Tennessee:								
Memphis	3	10	15		1	0	3	4
Nashville	0	3	0		0	1	0	2
Alabama:								
Birmingham	1	7	21	4	1	6	0	2
Mobile	0	2	3		0	0	0	2
Montgomery	0	3	9			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	2	1			0	0	
Little Rock	2	2	0		0	0	1	1
Louisiana:								
New Orleans	0	13	6	2	3	0	0	10
Shreveport	0	2	0		0	0	0	3
Oklahoma:								
Muskogee	1	6	3		0	0	0	0
Oklahoma City	0	5	5	4	0	0	0	3
Tulsa	1	6	4			0	0	
Texas:								
Dallas	1	18	13	1	0	0	1	9
Fort Worth	1	7	3		0	0	0	6
Galveston	0	1	0		0	0	0	2
Houston	0	4	7		2	0	0	2
San Antonio	0	8	2		1	0	1	2
MOUNTAIN								
Montana:								
Billings	3	0	0		0	0	0	1
Great Falls	3	0	0		0	3	0	0
Helena	0	0	0		0	0	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	1	0	0		0	0	0	2
Colorado:								
Denver	42	13	4		1	1	1	12
Pueblo	1	1	0		0	43	0	0
New Mexico:								
Albuquerque	0	0	0	1	0	0	0	3
Arizona:								
Phoenix	1	0	0		0	0	0	0
Utah:								
Salt Lake City	11	4	0		1	0	1	4
Nevada:								
Reno	0	1	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	20	5	10			2	16	
Spokane	13	3	1			0	0	
Tacoma	1	4	5		0	0	1	1
Oregon:								
Portland	14	12	1	2	1	1	7	4
Salem	1	0	0		0	0	1	0
California:								
Los Angeles	19	43	13	18	0	9	17	7
Sacramento	6	2	2		0	0	10	2
San Francisco	15	16	2		1	1	3	3

City reports for week ended November 1, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	2	2	0	0	0	0	1	0	0	13	23
New Hampshire:											
Concord	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Nashua	0	0	0	0	0	0	0	0	0	0	-------
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	2
Burlington	1	0	0	0	0	0	0	0	0	0	5
Massachusetts:											
Boston	47	47	0	0	0	16	2	1	0	7	194
Fall River	3	4	0	0	0	5	0	0	0	0	22
Springfield	5	2	0	0	0	1	0	0	0	2	30
Worcester	9	22	0	0	0	3	0	0	0	3	45
Rhode Island:											
Pawtucket	0	0	0	0	0	2	0	0	0	0	22
Providence	7	4	0	0	0	1	0	0	0	10	51
Connecticut:											
Bridgeport	7	5	0	0	0	0	0	1	0	0	23
Hartford	4	0	0	0	0	1	0	0	0	3	23
New Haven	4	1	0	0	0	2	0	0	0	0	47
MIDDLE ATLANTIC											
New York:											
Buffalo	19	-------	0	-------	-------	-------	0	-------	-------	-------	-------
New York	79	64	0	0	0	80	18	11	2	124	1,426
Rochester	6	25	0	0	0	2	1	0	1	2	67
Syracuse	6	2	0	0	0	0	0	0	0	12	31
New Jersey:											
Camden	2	5	0	0	0	0	0	0	0	4	39
Newark	10	10	0	0	0	5	1	1	0	16	95
Trenton	0	7	0	0	0	1	1	2	0	2	30
Pennsylvania:											
Philadelphia	54	123	0	0	0	29	6	4	0	6	482
Pittsburgh	34	38	0	0	0	10	1	2	0	4	180
Reading	1	1	0	0	0	0	0	0	0	1	25
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	13	23	0	0	0	8	1	1	0	3	134
Cleveland	23	43	0	0	0	13	1	2	0	8	183
Columbus	9	11	0	1	0	8	0	0	0	1	83
Toledo	11	3	0	0	0	3	0	2	0	0	68
Indiana:											
Fort Wayne	2	0	0	0	0	2	1	0	0	0	19
Indianapolis	11	25	1	0	0	1	0	0	0	5	-------
South Bend	4	3	0	0	0	2	1	0	0	1	24
Terre Haute	3	1	0	0	0	0	0	0	0	0	21
Illinois:											
Chicago	81	155	0	0	0	42	4	7	1	46	671
Springfield	3	0	0	0	0	1	0	0	0	6	17
Michigan:											
Detroit	62	49	0	0	0	17	3	2	0	47	260
Flint	12	15	0	0	0	0	0	0	0	5	29
Grand Rapids	8	4	0	0	0	1	1	0	0	7	30
Wisconsin:											
Kenosha	2	6	1	0	0	0	0	0	0	0	9
Madison	1	3	0	0	-------	-------	0	0	-------	2	-------
Milwaukee	18	8	1	0	0	9	0	0	0	24	95
Racine	3	8	0	0	0	1	0	0	0	2	29
Superior	3	0	0	0	0	0	0	0	0	2	13
WEST NORTH CENTRAL											
Minnesota:											
Duluth	8	1	0	0	0	2	1	1	0	13	32
Minneapolis	42	3	1	0	0	4	1	1	0	5	107
St. Paul	19	4	0	0	0	3	0	2	0	4	54

City reports for week ended November 1, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—continued											
Iowa:											
Davenport	1	2	0	0			0	0		0	
Des Moines	10	8	0	0			0	0		0	32
Sioux City	2	8	1	0			0	0		0	
Waterloo	2	1	0	0			0	0		1	
Missouri:											
Kansas City	13	23	0	7	0	12	0	0	0	1	107
St. Joseph	3	0	0	0	0	0	3	0	0	0	17
St. Louis	33	28	0	1	0	11	1	3	0	2	214
North Dakota:											
Fargo	2	0	0	0	0	0	0	0	0	4	10
Grand Forks	1	1	0	0			0	0		3	
South Dakota:											
Sioux Falls	2	0	0	8			0	0		0	12
Nebraska:											
Omaha	5	15	0	1	0	1	0	0	0	3	53
Kansas:											
Topeka	4	1	0	1	0	1	0	0	1	0	24
Wichita	5	5	0	0	0	1	0	0	0	0	33
SOUTH ATLANTIC											
Delaware:											
Wilmington	8	0	0	0	0	0	0	0	0	1	26
Maryland:											
Baltimore	14	19	0	0	0	15	4	3	2	15	242
Cumberland	1	0	0	0	0	0	1	0	1	0	11
Frederick	0	1	0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	16	9	0	0	0	12	2	3	0	2	154
Virginia:											
Lynchburg	1	0	0	0	0	1	0	1	0	8	10
Norfolk	2	7	0	0	0	1	0	0	0	0	
Richmond	10	23	0	0	0	2	0	2	0	0	56
Roanoke	4	3	0	0	0	1	0	0	0	2	18
West Virginia:											
Charleston	3	1	0	0	0	0	0	0	0	2	15
Wheeling	2	8	0	0	0	1	0	0	0	0	24
North Carolina:											
Raleigh	2	3	0	0	0	1	0	0	0	2	18
Wilmington	1	1	0	0	0	0	0	0	0	1	10
Winston-Salem	5	2	0	0	0	0	0	1	0	0	12
South Carolina:											
Charleston	1	0	0	0	0	8	1	0	0	2	20
Columbia	0	3	0	0	0	1	0	0	0	0	37
Greenville	1	8	0	0	0	0	0	0	0	0	1
Georgia:											
Atlanta	7	14	0	0	0	4	1	2	2	3	69
Brunswick	0	0	0	0	0	0	0	0	0	0	5
Savannah	1	1	1	0	0	1	0	2	0	0	38
Florida:											
Miami	1	1	0	0	0	2	1	1	0	0	12
St. Petersburg	0		0		0	1	0		0		6
Tampa	0	0	0	0	0	2	0	2	0	0	14
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	11	0	0	0	1	0	2	0	0	16
Tennessee:											
Memphis	6	8	0	0	0	9	2	8	1	0	83
Nashville	3	0	0	0	0	2	2	3	8	10	46
Alabama:											
Birmingham	4	16	1	0	0	5	1	8	0	2	70
Mobile	1	2	0	0	0	2	0	0	0	0	29
Montgomery	1	4	0	0			0	1		2	

City reports for week ended November 1, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0	--------	--------	0	0	--------	0	--------
Little Rock	2	0	0	0	0	5	0	0	0	0	--------
Louisiana:											
New Orleans	6	8	0	0	0	10	3	1	1	2	152
Shreveport	1	0	0	0	0	2	0	0	0	0	30
Oklahoma:											
Muskogee	2	0	0	0	0	0	0	0	0	0	--------
Oklahoma City	3	6	0	1	0	1	1	0	0	0	26
Tulsa	4	5	0	0	--------	--------	0	0	--------	0	--------
Texas:											
Dallas	6	7	0	0	0	6	0	2	0	0	69
Fort Worth	2	1	0	2	0	1	0	0	0	0	24
Galveston	0	0	0	0	0	0	0	0	0	0	14
Houston	3	4	0	1	0	6	0	1	1	0	66
San Antonio	0	0	0	0	0	7	0	0	0	0	47
MOUNTAIN											
Montana:											
Billings	1	0	0	1	0	0	0	0	0	1	8
Great Falls	2	6	0	0	0	0	0	0	0	4	12
Helena	0	0	0	0	0	0	0	0	0	0	6
Missoula	0	0	0	0	0	0	0	0	0	0	2
Idaho:											
Boise	1	1	1	0	0	0	0	0	0	0	5
Colorado:											
Denver	9	28	0	0	0	8	1	0	0	25	83
Pueblo	1	2	0	0	0	0	0	0	0	0	9
New Mexico:											
Albuquerque	1	0	0	0	0	3	0	1	0	1	13
Arizona:											
Phoenix	1	0	0	0	0	2	0	0	0	0	17
Utah:											
Salt Lake City	2	2	0	0	0	2	2	0	0	6	41
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	2
PACIFIC											
Washington:											
Seattle	8	10	1	0	--------	--------	1	9	--------	14	--------
Spokane	9	1	2	6	--------	--------	0	0	--------	3	--------
Tacoma	3	1	0	1	0	0	0	0	0	0	32
Oregon:											
Portland	7	6	3	0	0	1	1	1	0	1	65
Salem	1	0	0	0	0	0	0	0	0	0	--------
California:											
Los Angeles	23	9	0	0	0	35	2	0	0	17	269
Sacramento	3	0	0	0	0	1	0	0	0	9	12
San Francisco	12	2	0	0	0	7	1	0	1	12	133

City reports for week ended November 1, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	5	0
Massachusetts:									
Boston	1	0	0	0	0	0	2	19	2
Fall River	0	0	0	0	0	0	0	1	1
Worcester	0	0	0	0	0	0	0	1	0
Rhode Island:									
Providence	0	0	0	0	0	0	0	1	
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	1	0
MIDDLE ATLANTIC									
New York:									
New York	9	2	2	0	0	0	9	3	1
Rochester	0	0	0	0	0	0	0	1	0
Syracuse	0	0	0	0	0	0	0	2	0
New Jersey:									
Newark	1	0		0	0	0	0	0	0
Pennsylvania:									
Philadelphia	0	0	0	0	0	0	0	2	0
Pittsburgh	0	0	0	1	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	0	0	0	0	2	0
Cleveland	0	1	0	0	0	0	0	15	2
Columbus	0	0	1	1	0	0	0	7	0
Indiana:									
Indianapolis	1	0	0	0	0	0	1	4	0
Illinois:									
Chicago	5	2	0	0	1	1	2	7	0
Michigan:									
Detroit	1	3	1	0	0	0	1	4	0
Flint	1	0	0	0	0	0	0	1	0
Grand Rapids	0	0	0	0	0	0	0	2	0
Wisconsin:									
Madison	0	0	0	0	0	0	0	1	0
Milwaukee	0	0	0	0	0	0	0	1	1
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	0	0	0	0	0	0	5	0
St. Paul	0	0	1	1	0	0	0	1	0
Iowa:									
Sioux City	0	0	0	0	0	0	0	1	0
Missouri:									
Kansas City	0	1	0	0	0	0	0	1	0
St. Joseph	1	0	0	0	0	0	0	0	0
St. Louis	1	0	0	0	0	0	1	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore [1]	0	0	1	0	0	0	1	1	0
District of Columbia:									
Washington	2	0	0	0	0	0	0	0	0
Virginia:									
Richmond	0	0	0	0	0	0	0	1	0
West Virginia:									
Wheeling	0	0	0	0	0	0	0	1	0
North Carolina:									
Winston-Salem	0	0	0	0	2	2	0	0	0
South Carolina:									
Charleston [2]	0	0	0	0	1	0	0	0	0
Columbia	0	0	0	0	0	1	0	0	0
Greenville	0	0	0	0	0	0	0	0	1
Georgia:									
Savannah [1]	0	0	0	0	2	2	0	0	0

[1] Typhus fever, 3 cases: 1 case at Baltimore, Md., and 2 cases at Savannah, Ga.
[2] Dengue, 1 case at Charleston, S. C.

City reports for week ended November 1, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Kentucky:									
Covington	0	1	0	0	0	0	0	0	0
Tennessee:									1
Memphis	1	1	0	0	0	0	0	0	0
Alabama:									
Birmingham	2	0	0	0	2	1	0	3	1
Mobile	0	0	0	0	0	1	0	1	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	2	0	0	1	2	0	0	0
Shreveport	0	0	0	1	0	0	0	0	0
Oklahoma:									
Oklahoma City	0	0	0	0	0	0	0	1	0
Texas:									
Fort Worth	0	0	0	0	0	0	0	1	0
Galveston	0	0	0	0	0	0	0	1	0
Houston	0	0	0	0	0	0	0	2	0
MOUNTAIN									
Colorado:									
Denver	2	0	0	0	0	0	0	0	0
Pueblo	0	0	0	0	0	0	0	2	0
Arizona:									
Phoenix	0	0	0	0	0	0	0	1	0
Utah:									
Salt Lake City	2	0	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	0	0	0	0	0	0	1	1	0
California:									
Los Angeles	0	0	0	0	0	0	0	12	0
Sacramento	0	0	0	0	0	0	0	1	0
San Francisco	0	1	0	0	0	0	1	9	1

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended November 1, 1930, compared with those for a like period ended November 2, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities, September 28 to November 1, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929
98 cities	[2] 62	97	72	112	71	185	[3] 79	134	[4] 93	143
New England	49	88	53	94	64	128	97	110	[5] 85	114
Middle Atlantic	43	62	42	75	35	88	36	86	[6] 48	99
East North Central	80	124	100	139	92	155	106	163	131	168
West North Central	[7] 62	108	66	123	74	167	65	137	91	160
South Atlantic	62	129	106	139	92	180	97	139	106	144
East South Central	115	157	108	232	162	171	202	185	331	205
West South Central	112	198	64	255	127	339	[3] 88	396	108	434
Mountain	[8] 9	26	43	0	17	70	60	26	34	17
Pacific	[9] 62	56	94	60	102	87	118	121	78	111

MEASLES CASE RATES

	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929
98 cities	[2] 19	16	22	22	36	30	[3] 37	30	[4] 61	38
New England	83	34	31	16	44	58	69	29	[5] 125	27
Middle Atlantic	12	12	16	12	23	17	30	21	[6] 29	33
East North Central	5	12	11	29	14	40	16	47	18	40
West North Central	[7] 73	10	76	23	140	31	140	21	288	52
South Atlantic	20	11	11	9	7	9	13	9	18	15
East South Central	0	0	20	14	7	0	27	21	47	0
West South Central	7	0	0	4	4	4	[3] 4	15	0	0
Mountain	[8] 73	35	112	61	189	52	137	26	403	244
Pacific	[9] 27	65	24	65	66	72	21	63	28	58

SCARLET FEVER CASE RATES

	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929
98 cities	[2] 74	102	97	114	123	138	[3] 123	138	[4] 165	155
New England	73	135	106	162	148	173	144	162	[5] 195	177
Middle Atlantic	49	48	54	48	90	69	82	75	[6] 139	89
East North Central	107	149	137	173	179	214	172	192	220	226
West North Central	[7] 73	119	91	140	114	173	114	173	159	160
South Atlantic	70	120	115	139	115	127	148	174	152	139
East South Central	74	82	182	123	148	232	169	109	277	205
West South Central	37	72	37	130	78	103	[3] 73	149	71	149
Mountain	[8] 118	131	283	148	232	157	163	235	335	226
Pacific	[9] 89	128	87	87	59	113	104	104	54	181

SMALLPOX CASE RATES

	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929
98 cities	[2] 1	7	2	7	2	12	[3] 2	10	[4] 8	13
New England	0	0	0	0	0	0	0	0	[5] 0	0
Middle Atlantic	0	0	0	1	0	0	0	0	[6] 0	0
East North Central	1	7	2	3	4	7	2	12	1	20
West North Central	[7] 0	2	6	13	0	21	0	31	19	42
South Atlantic	2	0	0	0	0	0	0	0	0	0
East South Central	0	48	0	0	0	0	0	0	0	14
West South Central	4	0	4	4	4	0	[3] 8	0	4	27
Mountain	[8] 0	52	0	96	26	122	0	52	9	61
Pacific	[9] 2	36	7	34	0	84	21	51	17	29

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930, and 1929, respectively.
[2] Kansas City, Mo., Great Falls, Mont., and Spokane, Wash., not included.
[3] Fort Smith, Ark., not included.
[4] Concord, N. H., and Buffalo, N. Y., not included.
[5] Concord, N. H., not included.
[6] Buffalo, N. Y., not included.
[7] Kansas City, Mo., not included.
[8] Great Falls, Mont., not included.
[9] Spokane, Wash., not included.

Summary of weekly reports from cities, September 28 to November 1, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929
98 cities	[2] 20	16	21	26	17	17	[3] 18	15	[4] 14	11
New England	11	11	20	16	9	9	27	16	[5] 4	7
Middle Atlantic	15	14	14	10	11	8	13	8	[6] 10	8
East North Central	9	12	9	8	7	10	5	7	8	6
West North Central	[7] 13	15	9	8	15	25	8	6	13	17
South Atlantic	38	30	64	26	57	24	37	21	29	13
East South Central	67	21	47	27	47	68	94	48	115	34
West South Central	56	8	52	27	22	15	[3] 27	42	15	19
Mountain	[8] 118	113	43	749	34	192	77	200	0	78
Pacific	[9] 20	10	19	7	26	19	19	5	21	2

INFLUENZA DEATH RATES

	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929
91 cities	[10] 3	6	5	8	5	8	5	9	[4] 9	11
New England	0	4	4	0	7	2	2	0	[5] 2	2
Middle Atlantic	2	7	7	8	4	6	7	12	[6] 10	9
East North Central	1	5	3	8	4	9	8	10	6	9
West North Central	[7] 0	6	6	3	3	9	9	3	9	6
South Atlantic	2	7	2	11	5	9	4	4	16	19
East South Central	15	0	0	22	0	7	7	22	15	30
West South Central	11	16	11	16	8	16	8	20	23	27
Mountain	[8] 18	0	9	26	9	17	9	17	17	26
Pacific	3	9	0	6	9	6	9	3	3	3

PNEUMONIA DEATH RATES

	Oct. 4, 1930	Oct. 5, 1929	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929
91 cities	[10] 60	77	73	80	74	97	89	108	[4] 100	105
New England	40	36	64	74	80	97	91	63	[5] 96	74
Middle Atlantic	63	93	78	87	74	118	108	144	[6] 112	113
East North Central	54	61	55	65	51	81	53	91	88	101
West North Central	[7] 81	108	86	54	53	69	59	72	95	135
South Atlantic	48	81	79	103	88	81	125	112	123	116
East South Central	118	30	140	104	184	112	96	134	74	157
West South Central	77	113	119	113	96	90	134	86	111	105
Mountain	[8] 137	87	94	122	189	122	77	122	163	131
Pacific	49	47	49	57	80	82	74	44	40	31

[2] Kansas City, Mo., Great Falls, Mont., and Spokane, Wash., not included.
[3] Fort Smith, Ark., not included.
[4] Concord, N. H., and Buffalo, N. Y., not included.
[5] Concord, N. H., not included.
[6] Buffalo, N. Y., not included.
[7] Kansas City, Mo., not included.
[8] Great Falls, Mont., not included.
[9] Spokane, Wash., not included.
[10] Kansas City, Mo., and Great Falls, Mont., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended November 1, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended November 1, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia		10		2		
New Brunswick						6
Quebec	1					42
Ontario		4	1	32	20	1
Manitoba	1			2		5
Saskatchewan				1	2	1
Alberta				2		1
British Columbia			1	2	3	2
Total	2	14	2	41	25	58

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended November 1, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended November 1, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	2	Mumps	17
Chicken pox	83	Scarlet fever	112
Diphtheria	58	Tuberculosis	29
German measles	2	Typhoid fever	40
Measles	16	Whooping cough	63

CUBA

Habana—Communicable diseases—October, 1930.—During the month of October, 1930, certain communicable diseases were reported in the city of Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	6		Rabies	1	
Diphtheria	16	1	Scarlet fever	7	1
Malaria [1]	27	2	Tuberculosis	39	9
Measles	7		Typhoid fever [1]	11	4

[1] Many of these cases are from the interior.

MEXICO

Tampico—Communicable diseases—October, 1930.—During the month of October, 1930, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	4	3	Tuberculosis	38	27
Enteritis (various)		83	Typhoid fever	4	1
Influenza	2	1	Whooping cough	10	
Malaria	123	9			

TRINIDAD (BRITISH WEST INDIES)

Port of Spain—Vital statistics—August–September, 1929 and 1930.—The following statistics for the months of August and September, 1929 and 1930, are taken from a report issued by the Public Health Department of Port of Spain, Trinidad:

	August		September	
	1929	1930	1929	1930
Number of births	144	123	154	168
Birth rate per 1,000 population	25.5	21.5	28.2	30.4
Number of deaths	140	104	122	103
Death rate per 1,000 population	24.8	18.2	22.4	18.6
Deaths under 1 year	27	28	19	15
Infant mortality rate per 1,000 births	187.5	269.2	123.4	89.3

YUGOSLAVIA

Communicable diseases—September, 1930.—During the month of September, 1930, certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	138	14	Puerperal fever	3	1
Cerebrospinal meningitis	11	7	Rabies	1	1
Diphtheria	890	108	Scarlet fever	965	91
Dysentery	306	46	Tetanus	33	14
Measles	164	1	Typhoid fever	779	72
Poliomyelitis	5	1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930				October, 1930				November, 1930	
							6	13	20	27	4	11	18	25	1	8
Afghanistan	C			[1] P	P											
China:																
Amoy	C							1	1							
	D							1	1							
Canton	C	3	2	2							1			1		
	D			1												
Shanghai	C					8	4		22	23	5	6	4	1		
	D						1	1	1	2			2			
Shensi Province	C								P							
Swatow	C	3	7		3	1	1									
Tientsin	C				2	1										
India	C	56,311	37,102	26,121	42,893	14,249	11,823	13,072	12,407							
	D	44,878	25,711	13,822	22,358	5,879	5,732	6,409	5,939							
Bassein	C	7					1									
	D	5														
Bombay	C				14			1		1	3	1	11	17		
	D				8			2		1	2		8	10		
Calcutta	C	609	327	220	63	8	10		9	4	4	7	9	7		
	D	372	179	128	30	3	3		6	3	4	4	4			
Negapatam	C		1													
	D		1													
Rangoon	C	9	6	1	1	1	1					1				
	D	3	4	1	1	1						1				
India (French):																
Chandernagor	C	6	3	1			1				1	2				
	D	6	2								1					
Karikal	C		3													
	D		3													
India (Portuguese)	C				1		1									
Indo-China (see also table below):																
Pnompenh	C	1	40	32	11					1		1		1		
	D	5	18	22	6											
Saigon and Cholon	C	160	48	10	5					1	1			1		
	D	101	23	3	1											

Philippine Islands:[2]																
Ports—																
Cebu	C		1	65	9	1	1									
	D			36	8	1	1									
Iloilo	C			29	64	3	4	1	2	1						
	D			22	56	4	5	2	3	2			2			
Manila	C	1			1	16	13	10	4	2	1	2				
	D					5	6	1			1					
Provinces—																
Antique	C				20	2	25	12	8	12		28				
	D				12	1	14	12	7	8		10				
Bohol	C				138	30	14	4	1							
	D				79	12	6	2								
Bulacan	C		3	4	1	1	2	1			2					
	D		1			1	1				1					
Capiz	C			3	2	1										
	D			2	2											
Cebu	C	1	355	713	85	1	16	8								
	D	1	170	303	50	1	6	4								
Iloilo	C		2	309	571	71	60	61	46	18	7	13	12	10	10	4
	D		1	193	376	45	45	35	26	15	6	7	12	7	7	3
La Union	C			1												
Leyte	C		47	11												
	D		19	11												
Masbate	C		10	92	34											
	D		3	35	14											
Misamis, Occidental	C			3												
	D			3												
Negros, Occidental	C	10	140	568	343	40	43	24	15	8	10	5	5	12	3	19
	D	7	88	368	237	32	30	20	9	6	5	6	3	12	3	12
Negros, Oriental	C			23	8											
	D			13	4											
Nueva Acija	C			1												
	D			1												
Pampanga	C		2	2		1										
Pangasinan	C			3	1											
	D			2	1											
Rizal	C		1	1												
	D		1	1												
Samar	C				18			3	1	4			3	6	3	4
	D				16			2		4			3	5	1	4
Sorsogon	C															5
	D															4
Surigao	C				28	1				(3)						
	D				17	2										
Tarlac	C				1											

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, Philippine Islands.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930				October, 1930				November, 1930	
							6	13	20	27	4	11	18	25	1	8
Siam	C	33	27	20	3							1	3			
	D	21	19	9	2								1			
Bangkok	C	9	12	8	1							1	2	1	2	
	D	3	5	3	1							1	1	1	1	
Songkla	C			10												
	D			6												
On vessel:																
S. S. Malwa from Shanghai	D								1							
S. S. Sassari at Massoua, from Jeddah	C	1														
	D	1														
On small boat at Port Cebu, from Bantayan Island	C		1													
	D		1													

Place		April, 1930	May, 1930	June, 1930	July, 1930			August, 1930			September, 1930			October, 1930	
					1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20
Indo-China (French) (see also table above):															
Annam [1]	C	60	23	16			1		3						
Cambodia [1]	C	24	88	144			43	37	22		23	13	2	16	
Cochin-China [1]	C	48	671	273			46	22	5		9	6	18	14	6

[1] Reports incomplete.

PLAGUE

Place		May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended—															
					August, 1930					September, 1930				October, 1930				November, 1930	
					2	9	16	23	30	6	13	20	27	4	11	18	25	1	8
Algeria:																			
Algiers	C			3		1		6	1	2	6	2	1	1	2	2	5		
	D																3		
Constantine	C		1	1															
Oran	C			3	1	1	1	1	1	2	3	4		4	4	2	1		
Plague-infected rats				2						10			2						
Philippeville	C									1			1		1	1	1		
Belgian Congo	C			2	1		1		2	3									
	D			2	1		1			3									
British East Africa (see also table below): Uganda	C	227	406	228	52	67	62	55	44	40	57								
	D	195	328	213	50	64	62	53	37	39	55								
Canary Islands: Las Palmas	D				1														
Ceylon:																			
Colombo	C	6	1	3			1	1	2				1	1		1			
	D	5	1	3			1	1	3				1	1		1			
Plague-infected rats			1	1															
China:																			
Manchuria—Tungliau and Nungan	C							30			29	P	2						
Shensi	C											P					P		
Dutch East Indies:																			
Batavia and West Java	C	82	98	84	19	30	20	14	13	14	26	26	22						
	D	82	98	84	19	30	20	14	12	14	26	24	22						
Plague-infected rats		5	4			1				1	1	1							
Java and Madura	D	185	202	217	45	51	47	45	55	54	67	84	75	68					
Ecuador (see table below).																			
Egypt:																			
Alexandria	C	13	19	23	2	2	4	3	3	3	2	2	2	1	3	3	2	1	1
	D	3	9	10	2	1	3		5	1	2		3	1	1	1	3		2
Assiout	C	20	9	2															3
	D	5	3	2															1
Beni-Suef	C							1											
Dakahlieh	C	11	1																
	D	2																	
Gharbieh	C				3														
	D				1														
Girga	C			1					1										
Minieh	C	7	10	3															
	D	1	1																
Port Said	C	2	2	1	1												1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930					September, 1930				October, 1930				November, 1930	
					2	9	16	23	30	6	13	20	27	4	11	18	25	1	8
France:																			
Marseille	C								2	2	1					4	2	1	
St. Ouen	C			1															
	D			1															
Gambia	C							4											
	D							4											
Greece (see also table below):																			
Patras	C		1	1															
Pyrgos	C													2					
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats			1																
India	C	648	240	377	145	189	293	250	593	600	704	600							
	D	635	187	256	98	84	154	141	262	291	328	251							
Bassein	C								1		1							1	
	D								1		2								
Bombay	C	6	3	1						1			1			1	1		
	D	5	2	1						1				1		1			
Plague-infected rats		81	26	52	10	8	9	9	12	9	11	15	21	13	16	14	2		
Madras Presidency	C	38	39	47	35	21	7	18		47	41	39			7				
	D	11	22	31	13	9	1	11		23	13	21			9				
Rangoon	C	4	1	2	2	1			2	1	5	2	2					1	
	D	3	1	2	1	1			2	1	4	2	2					1	
Plague-infected rats		5	1	6	4		2	1	2		2	4		1			1		
India (Portuguese)	D	7					P												
Indo-China (see also table below):																			
Pnompenh	C	3	6	2		2		2	2	1			1	1					
	D	1	7	2									1	1	1		1		
Saigon and Cholon	C	1	2				1			1			1						
	D		1																
Iraq: Baghdad	C	37	28	18	4	3	2						1						
	D	18	15	7		2	1						1						
Kwang-Chow-Wan	C	34	31	4			1												
Madagascar (see also table below): Tamatave	C		1	1	2					1	P			1			3		
	D													1			3		
Morocco	C	71	3	1		8	7										4		
	D	34	4			1	1												

Nigeria: Lagos	C	2	5	1	2	1	3	1	1	1	3	1		3		2			
	D	2	5	1	2	1	3	1	1	1	3	1		3		2			
Plague-infected rats		17	11	18			4	4		4	2	4							
Senegal (see table below).																			
Siam	C	5			2	3		2	8								3	1	
	D	4			1	3		2	2								3	1	
Bangkok	C	5			1	2													
	D	4				2													
Nagara Rajsima	C				1			1		1									
	D				1			1		1									
Syria: Beirut	C		12	9		1		1	3	2							1		3
Tripolitania	C						2												
Tunisia:																			
Sfax district	C	21	9	6		1													
Tunis	C	1	1	5															
	D		1	1															
Union of Socialist Soviet Republics:																			
Saisk Region	C		2	5	4		3												
	D		1	4	3		2												
Stavropol Region	C		1																
	D		1																
Union of South Africa:																			
Cape Province	C	P	1	1				1				1							
	D			1			1				1								
Orange Free State	C								1		1								
	D								1		1								

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	107	97	87	38	
Ecuador: Guayaquil	C	0	0				
	D	0	0				
Plague-infected rats		0	0				
Greece (see also table above)	C		1				
Indo-China (see also table above)	C		11	1	2	4	
Madagascar (see also table above):							
Ambositra Province	C	1					
	D	1					
Antisirabe Province	C	19	3	24			
	D	19	3	24			
Miarinarivo Province	C	5	1	1			
	D	5	1	1			
Moramanga Province	C	1	3		2		
	D		3		2		
Madagascar (see also table above)—Con.							
Tananarive Province	C	15	16	28			
	D	14	16	28			
Senegal:							
Baol [1]	C	13	2	62	79	48	53
	D	11	2	48	20	23	35
Dakar [1]	C	52	53	140	108	3	
	D	42	117	122	90	8	
Louga [1]	C	54	60	138	75	61	37
	D	27	21	103	33	30	21
Thies [1]	C	21	52	54	34	12	16
	D	8	35	30	20	4	10
Tivaouane [1]	C	135	43	119	110	20	43
	D	69	23	70	54	14	25

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	Week ended— August, 1930					September, 1930				October, 1930				November, 1930	
					2	9	16	23	30	6	13	20	27	4	11	18	25	1	8
Algeria:																			
Algiers	C	3		1		1		2											
Constantine	C		1	1															1
Arabia: Aden	C			1															
Bolivia: La Paz.[1]																			
British East Africa (see also table below):																			
Tanganyika	C	409	1,610	168	26	51	44	121	198	288		36	27						
	D	70	301	42	4		3	30	4	55		1	1						
British South Africa:																			
Northern Rhodesia	C	59																	
	D	9																	
Southern Rhodesia	C	155	79	31				1	1										
	D	13																	
Canada:																			
Alberta	C			5	1							1		13	8	1			
British Columbia—Vancouver	C	4	2	6	1	1	2	2			1	1	1			1		3	
Manitoba	C	10	4						1										
Ontario	C	82	47	24	8	3	5	4	2	2	6		1		3	15		20	
North Bay	C	1																	
Ottawa	C	25	15	13	5	1	1		2	1	2						14		
Toronto	C	4	4	1							1								
Quebec	C		4	3		2	2	1											
Montreal	C				7														
Saskatchewan	C	39	22	5				8			1			3				2	
Regina	C	4																	
China:																			
Changking	C	P	1	P	P		P	P	P	P	P	P	P						
Foochow	C	P	P	P		P		P		P		P		P					
Hong Kong	C	12	4	2															
	D	9	3	1															
Manchuria—																			
Harbin	C	20	4	3			2												
Kwantung—Dairen	C	8	16	8															
	D	4	1																

Nanking	C	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
Shanghai—																			
Foreigners only	C	2	5	4	3						18					1	1		
Including natives	D	5	3								2								
Swatow	D	6	4	1	1		2	1	1	1			1			3			
Tientsin	C	1											1						
Chosen (see table below).																			
Colombia:																			
Barranquilla	C				2														
Buenaventura	C	4	6	10		1	1												
Cali	D													1		1			
Costa Rica:																			
Port Limon	C	2	2																
San Jose [2]	C	2																	
Curacao (alastrim)	C	2	1	2			1												
Dutch East Indies:																			
Borneo	C	16	12	2															
	D	1	1																
Java—																			
Batavia and West Java	C	12	13	8	1	4	5	2	2	5	2	2	10		1				
	D	7	3	5	1	1	1	2	2		1	1	1		1				
East Java and Madura	C			1															
Sanggi Islands	C	26		11	36				11										
	D	5		3	2				3										
Egypt: Port Said	C	1		3															
France (see table below).																			
Great Britain:																			
England and Wales	C	1,417	926	529	70	86	95	93	99	106	75	61	82	74	44	125	86		
Ashton under Lyne	C	17	7	8															
Bradford	C	2		1										1	1	1			
Cardiff	C			2													1		
Leeds	C			1													1		
London	C	637	498	250	36	50	41	51	43	44	36	41	30	34	23	33	29		
London and Great Towns	C	1,078	753	408	61	73	71	80	79	84	51	54	55	56	32	80	52		
Stoke-on-Trent	C	62	32	9	1	1					1	1			1				
Scotland	C		4	1						5									
	D			1															
Honduras: Naco	C										5								
India	C	22,835	12,962	7,630	11,313	1,282	1,236	1,046	830	940	610	751							
	D	5,451	3,531	2,348	368	327	290	261	202	209	119	150							
Bombay	C	218	113	50	6	2	2	2	2	1	1	2							
	D	161	79	33	5	2	1	2	2	1	2								
Calcutta	C	302	161	73	4		12	9	4	5	3	2	3	4	3	2	2		
	D	258	146	56	4		8	9	3	4	1	1	3	4	3	1	2		
Cochin	C	37	16	6	2	4	4	4	1	1		1			8	4	3		
	D	8	4						1						1		1		
Karachi	C	14	7	1	2		2				1	3							
	D	4	3		2		1					2							
Madras	C	72	35	49	19		9	10	9	11	6	8	4	4	8	3	2		
	D	15	10	12	3		5	3	1	1	1	3	1	2	3	2			

[1] From Jan. 1, to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.
[2] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica, outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8
India—Continued.																			
Moulmein	C	89	21	18				2	1										
	D	21	7	1				1			1								
Negapatam	C	1	2	4	2		2		1	2		6	4	2	5	3	2		
Rangoon	C	6	9		1	1	1									2			
	D	1	2																
Tuticorin	C	5	1													1			
Vizagapatam	C	5	1												1				
India (French):																			
Chandernagor	C	24	19	4							1	2			3				
	D	7	3	3						1	1				1				
Karikal	C	12	11	2		8		1		5			1						
	D	3	8	2		8		1		2			1						
Pondicherry Province	C	40	23	26	7	8		7	11	7	7	10	11	10	6		1		
	D	36	23	25	7	8		7	11	7	7	8	11	8	6		1		
India (Portuguese)	C	47	28	1	1	6	1	1	1	2		1							
	D	8	10	1	1			1											
Indo-China (see also table below):																			
Pnompenh	C	3		1											2				
	D		1	1			1												
Saigon and Cholon	C	3	1			1			1										
	D	2			1	1	1		1										
Iraq:																			
Baghdad	C	1	1	3			1					1		2					
	D	1		1			1												
Mossoul Liwa	C	21	4	67									63		4	2			
	D	3	1	20									27						
Jamaica (alastrim)	C	2																	
Macao	D	1																	
Mexico (see also table below):																			
Jalisco (State) Guadalajara	D	7	15	4		1								2		1	1		
Juarez	C		6			2					1		1				1		
	D		1			1													

Mexico City and surrounding territory	C	80	77	37	2	3	3	2	7	2	1	2	1	3	5				
	D	32	17	8	1	3	2		1	1	1	2			1				
Progreso	C	1																	
	D	1	1																
Morocco (see table below).																			
Nigeria: Lagos	C		1																
Poland	C	3	2																
Portugal:																			
Lisbon	C	8	10	13		6	19	25	7	8		12	4	5		7			
Oporto	C							1											
Siam	C	2		6										1					
	D			3															
Somaliland, British: Boales	C													1					
	D													1					
Spain	C		12	5	2					4	1								
Straits Settlements	C	11	9	11	1	1	5	1	1	2	2	1	1	1	1	2	3		
	D	3	2	3		1	1	1		1					1				
Sudan (Anglo-Egyptian)	C	19	67	12				42	102	5	20	1	25	1	56		3		
	D	2	3	1				3	50	2			2		5				
Sudan (French) (see table below).																			
Switzerland: Berne Canton	C			1	1	1							1						
Syria (see table below).																			
Taiwan: Taihoku (see table below).																			
Tunisia: Tunis	C	2	2	1								2							
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P		P						P	P	P							
Orange Free State	C			P	P														
Transvaal	C					P	P	P	P	P	P	P	P						
Upper Volta	C	1	13																
On vessel:																			
S. S. Naldera, at Port Said	C	1																	
S. S. Manoa, from Honolulu to San Francisco	C			1															

Place		April, 1930	May, 1930	June, 1930	July, 1930			August, 1930			September, 1930			October, 1930	
					1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20
Indo-China (see also table above)	C	261	305	213			238	59	34		54	52	86	32	62
Sudan (French)	C	521	274	76		34				39		P			17
	D	36	32	18						3					2
Syria: Beirut	C	19	7	7			2	1							
Taiwan: Taihoku	C	12													

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		April, 1930	May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Place		April, 1930	May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930
British East Africa (see also table above):								France	C	58	51				
Kenya	C	174	171	142	186			Mexico: Durango (see also table above)	D	4	4	3	3	3	2
Uganda	C		78					Morocco	C	10	18	5	3	8	1
	D		69					Turkey	C	3	16				
Chosen	C	253	107		3	2									
	D	53	35												
Seishin	C	5	2	1	2										
	D	1	1												

TYPHUS FEVER

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25
Algeria:																		
Algiers	C	8	15	3	6				2		3							
Constantine Department	C	15	6	12	2				3						2			1
Oran	C		3	4	3		1			1						1	2	
Bolivia: La Paz.[1]																		
Brazil: Porto Alegre	C		1															
Bulgaria	C	15	6	16	10		1				2	2		2		1		
	D	1	2	1	1													
China:																		
Manchuria—Harbin (see also table below)	C	52	13	8	2	2				2								
Shanghai	C						1											
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	1		1	1			1			1	1	1	1				
Beheira Province	C	2	49	45	15								1					
	D		13	4	2													

Cairo	C					2			5			1						
Port Said	C								4		1				1			1
Great Britain: Scotland—																		
Dunfermline	C				1													
Glasgow	C		1															
	D		1															
Greece (see table below).																		
Ireland:																		
Irish Free State—																		
Galway County—Oughterard	C				2													
Kerry County—Dingle	C	5																
Leitrim County—Mohill	C			9	1													
Mayo County—																		
Ballina	C		2	1	1													
Castlebar	C								1									
Swinford	C		14															
Westport	C				2	1												
Roscommon County—																		
Roscommon	C				1													
Strokestown	C				1													
Wicklow County—Shillelagh	C			4	2													
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico:																		
Durango	D												1	1		1		
Mexico City, including municipalities in Federal District	C	4	6	9	5	2	2	2	3	2	2	3				3		
	D	4	3	1		1	1				1	1				2		
Morocco	C	15	11	15	11				8		2							1
	D	3															1	
Palestine	C	1	2	2	6		1	1	1		1	1	1		1	1	1	
Poland	C	243	171	117	36	10	15	2	7	2	3	6	12	3	6	6	7	7
	D	15	5	11	4	1		1	1		1			1			1	
Portugal:																		
Lisbon	C	4																
Oporto	C	1						1							1	1	1	
Rumania	C	186	227	58	[illegible]	5		2	2	1		1	2	3				
	D	11	35	5	8	2												
Spain: Valencia	C			3	3							1					1	
	D				1							1					1	
Tunisia	C		6	18	24	2	5		3	1	1		4	1	1	1	9	
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P				
Natal	C	P	P	P	1	P	P	P				P						
Orange Free State	C		P	P	P	P	P	P	P	P	P	P	P					
Transvaal	C	P			P	P	P	P		P	P	P	P					
Yugoslavia (see table below).																		

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr., 1930	May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930
China: Harbin (see also table above)	C	204	240		14	5	
Chosen: Seoul	C	3	43	2	3	2	1
Czechoslovakia	C	29	12	1		1	
Greece: Athens	C	1	3	3	6	6	
Latvia	C		3	3	3	1	

Place		Apr., 1930	May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930
	C	73	27	16	18	7	3
	D	4				1	
Turkey	C	3	16	2		2	
Yugoslavia	C	22	16	6			
	D	4	1				

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Ry., between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

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SPECIAL ARTICLES

Mottled Enamel Found in a Segregated Population

Prevalence, Treatment, and Prevention of Trachoma

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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MOTTLED ENAMEL IN A SEGREGATED POPULATION

By GROVER A. KEMPF, *Surgeon*, and FREDERICK S. MCKAY, D. D. S., *Consulting Specialist in Child Hygiene, United States Public Health Service*

Mottled enamel has an interesting history. An article on this condition by Passed Asst. Surg. J. M. Eager, of the United States Public Health Service, then stationed in Naples, Italy, appeared in the PUBLIC HEALTH REPORTS in 1901.[1] Doctor Eager noticed this condition of the enamel among Italian emigrants, particularly those coming from Pozzuoli, a community about 5 miles from Naples. This dental defect was called "Denti di Chiaie," after Professor Stefano Chiaie, who first described the condition. From Doctor Eager's description it is recognized as the same enamel defect found in various places in the United States and in other countries, and now known as "mottled enamel."

Incidentally, and curiously enough in the light of what is to follow later in this report, it was reliably reported to one of us (McKay) during an investigation of this Italian district in 1927, that Pozzuoli had changed its water supply and was no longer afflicted with this condition.

It was not until 1916 that further information appeared in the literature, when Dr. G. V. Black and Dr. Frederick S. McKay published a series of joint articles in *Dental Cosmos* on this condition. These men were the first in the United States to make an actual study of this enamel defect and to publish their results.

The term "mottled enamel" was first used by Black as a descriptive name for the condition. His description is quoted as follows:

> The most essential injury occurring in this mottled enamel is the appearance of the teeth. * * * The teeth are of normal form, but not of normal color. When not stained brown or yellow, they are a ghastly, opaque white that comes prominently into notice whenever the lips are opened. * * * In many cases the teeth appear absolutely black. Mottled enamel is distinguished especially by the absence of cementing substance between the enamel rods in the outer fourth, more or less, of the enamel, and presenting great variety of color, rendering it totally different from anything else I have known.

The outer glazed enamel surface, or Nasmyth's membrane, is present and appears to be normal, except in what have been termed the

[1] Nov. 1, 1901, pp. 2576-2577.

"corroded" cases. The associated pigmented or stained phase of mottled enamel is called "brown stain." This brown stain does not occur in all cases of mottled enamel, and it seems to be limited to the labial surfaces of the upper incisors and cuspids. Chemical analysis of the "brownin," or pigment, has been made, and it is said to be manganese.

It is extremely rare to find mottled enamel on any of the temporary teeth. A very few cases have been observed in the various affected districts in which there was a slight flecking of the typical white spots on the enamel of the temporary molars, but never to our knowledge has the brown stain been observed on any temporary teeth.

This typical brown stain can not occur unless the enamel bears the fundamental mottled defect; but not all teeth with mottled enamel are stained. McKay is of the opinion that the brown stain appears after the mottled teeth have erupted.

Noyes, in Dental Histology and Embryology, expresses the hypothesis that "the enamel rods and the cementing substance have a different origin, or are formed by different cells, and that pathological conditions may prevent the formation of one and not of the other."

In Black's first description of this lesion, it was made to appear that the enamel rods were themselves intact and of normal form and contour, but with the cementing substance absent. It has since been made evident, however, through the work of J. Leon Williams, that in some cases at least the rods themselves have been diminished in contour.

McKay has investigated the condition in several affected districts in Colorado, Texas, Virginia, and Arizona. His results were published in *Dental Cosmos,* May to August, 1916. In 1917, he studied several endemic areas in South Dakota, and later extended his investigations to include areas in Idaho and California. Recently other centers have been reported in Illinois, North Dakota, and Minnesota.

The condition occurs in various parts of the world, notably in Italy, certain of the Bahama Islands, Barbados, Holland, Cape Verde Islands, China, Mexico, Spain, Argentina, and other South American countries and in South Africa. Wherever it occurs the characteristics of the enamel defect are the same. Recently McKay noticed this condition in the photograph of a sheik of the desert, published in the National Geographic Magazine.

The nature of the defect can readily be seen in the photographs of several typical cases presented herewith.

The disfiguring effect of mottled enamel can readily be appreciated. This condition is not subject to improvement or alteration through natural means, but only through a difficult operative procedure.

When we also realize that every child who is born and reared in an endemic area is practically certain to have this disfigurement in some degree, we can readily understand that this is a problem worthy of solution.

The time of development of the enamel of the deciduous and permanent teeth is of great importance in considering the etiology of mottled enamel, and the accompanying figures are taken from Burchard and Inglis, who used Peirle's table of calcification.

The ages are subject to some variation, and the mottling of the enamel in itself serves as an indication of the age when the enamel of the permanent teeth was developed in the child.

As previously stated it has been held that the temporary teeth are free from this defect, but in the survey with which this report deals, some slight indications of mottling of the temporary teeth were noted. In explanation of this it may be stated that the formation of the enamel of these teeth has practically been completed at the time of birth or very soon afterward, but this must undoubtedly be subject to fairly wide variation. Some children might not have all enamel of the temporary teeth developed until several months or even a year after birth. After the protective influence of the placental circulation has been terminated, the enamel remaining to be developed is affected by the etiological factors in the endemic area. This could be particularly true in the premature baby. It follows, therefore, that there may be no absolute reason against mottling of some of the temporary teeth.

The following table from Burchard and Inglis [1] gives the approximate ages for the eruption of the permanent teeth:

First molars	5½ to 7 years.
Central incisors	7 to 8 years.
Lateral incisors	8 to 9 years.
First bicuspids	10 to 11 years.
Second bicuspids	11 to 12 years.
Cuspids	12 to 14 years.
Second molars	12 to 15 years.
Third molars	16 to 20 years or more.

For convenience we will divide the premanent teeth into three groups, as did Black and McKay in their reports:

	Calcification		Eruption
First group:			
First molars	1 to 5 years		5½ to 7 years.
Incisors	1 to 7 years	central	7 to 8 years.
		lateral	8 to 9 years.
First bicuspids	7 to 8 years		10 to 11 years.
Second group:			
Second bicuspids	7 to 8 years		11 to 12 years.
Cuspids	7 to 8 years		12 to 14 years.
Second molars	5 to 9 years		12 to 15 years.
Third group:			
Third molars	9 to 12 years		16 to 20 years or more.

[1] Dental Pathology and Therapeutics, 7th edition. Lea & Febiger, Philadelphia and New York, 1928.

The endemic area with which this report deals was reported to the Public Health Service in 1927, and centers in the town of Bauxite, Ark., which was established in 1901 to provide homes and a social environment for the employees of a mining company.

The original supply of water for domestic purposes came from shallow surface wells and a few springs. As the population increased, a larger supply was required, and in 1909 a deep well of 255 feet depth was drilled, later augmented by two other wells close by. Water from these wells was piped into the homes.

Following this, most of the shallow wells were gradually filled, and within the community proper the deep wells were the chief source of the water supply. This deep well water has a disagreeable alkaline taste, and many of the families continued the use of spring water for drinking, especially during the warm months.

The evidence collected during the examination of the children in the town school, consisting of the elementary grades and the high school, can be summarized as follows:

1. No cases of the enamel defect were found which antedated the introduction of the deep well water.

2. The oldest individual found with this enamel defect was born about the time that the deep well water was introduced.

3. All individuals in the community who had used the deep well water during any considerable period of enamel formation exhibited this defect.

4. No individual in the community whose enamel had developed elsewhere exhibited the defect.

5. Certain individuals who, although residents of the community and attending school there, but who actually lived beyond the distribution of the deep well water and depended upon the original shallow wells, exhibited only normal enamel.

Evidence supporting these postulates is presented in the tables appearing later in this report. In no district so far observed by one of the authors (McKay) has the evidence pointed so directly to a relation between the use of a certain definite water and the production of this enamel defect.

It is necessary to consider the possibility, however, that some factor in the food supply of these individuals, either before or after birth, bears some relation to the defect in question.

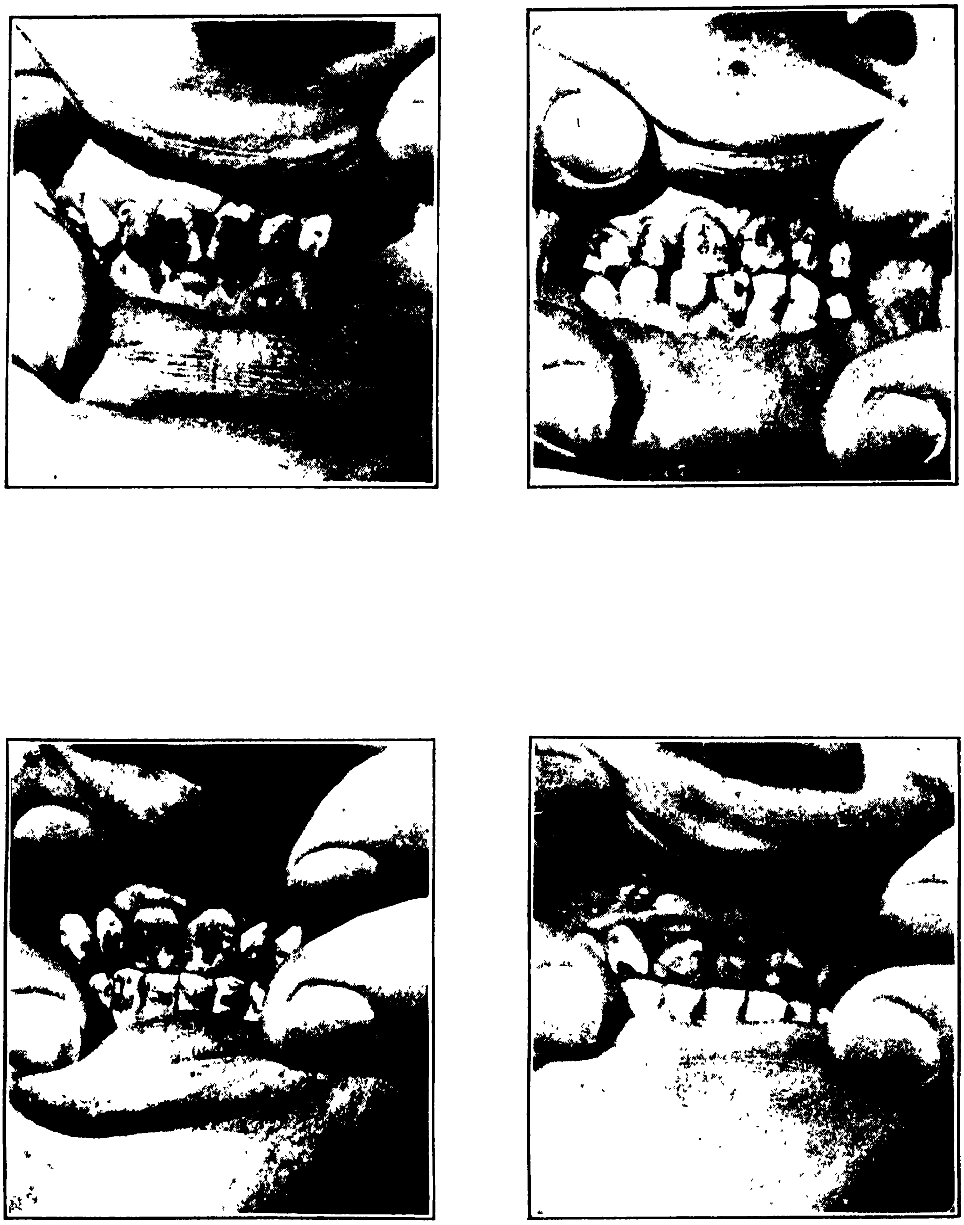
In considering this point it is important to note that the enamel of the temporary teeth is formed almost entirely before birth, and is, therefore, directly dependent upon the prenatal nutrition. These teeth, however, practically never show the defect. The permanent teeth do not commence to form until about one year after birth (according to the average), and, hence, can not be even remotely related to the maternal nutrition.

A case of mottled enamel without stain. Note paper-white appearance of the enamel

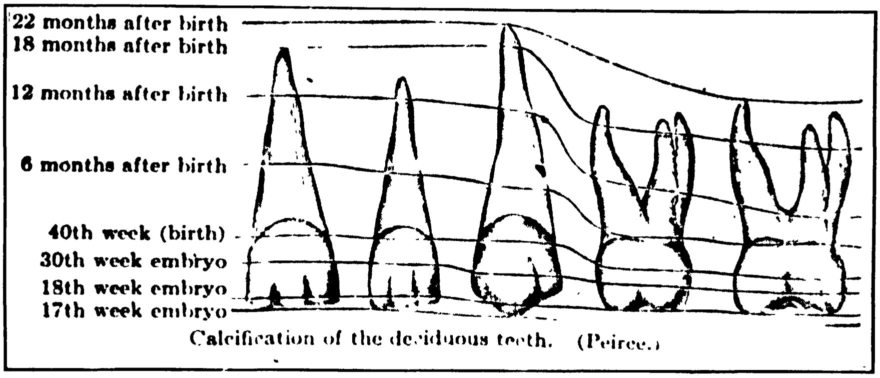
Case of typical mottled enamel with brown stain. The teeth are well formed and the stain is limited to the labial surface of the upper incisors

Extreme type with corrodedlike condition of the enamel

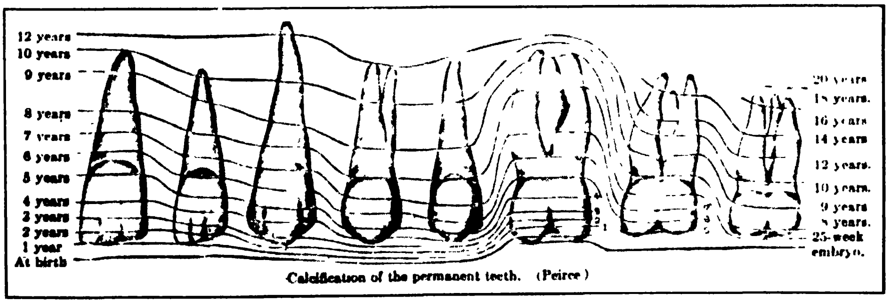
Stained and corroded teeth



Additional cases which show the stained and corroded condition of the teeth



Calcification of the deciduous teeth. (From Dental Pathology and Therapeutics, seventh edition, by Burchard and Inglis)



Calcification of the permanent teeth. (From Dental Pathology and Therapeutics, seventh edition, by Burchard and Inglis)

The source of the food supply of these people is from a central store. The staple articles here, under the complexities of present-day civilization, are produced and manufactured elsewhere. In season certain articles are procured from surrounding truck farmers. It may be said that these locally grown products are reflective of the chemistry of the local soil. But the water from the shallow or surface wells is equally indicative of soil chemistry, and such wells are associated with normal enamel.

The diet of such of these persons exhibiting the enamel defect was in nowise different, except in the source of the water, from that of persons in the same environment who had escaped the defect.

In the children examined in the school there was ample opportunity to observe all gradations of tooth eruption, from those in whom the first permanent teeth were just appearing, to those with all permanent teeth erupted.

The children were requested to fill a questionnaire giving the place of birth and a history of places of residence since birth, with dates or ages at time of each change of residence. Each child was examined by McKay under natural illumination and without previous knowledge of the child's residence. The facts regarding age, time in Bauxite, etc., were verified by the child after the examination. This was later checked from the rental records of the company.

In no community previously examined by McKay were the facts relating to age and place and duration of residence so accurately recorded as in Bauxite, owing to access to the mining company's records and rent rolls, and the close cooperation given by the company's director of social relations among the employees.

A total of 458 children from 5 to 18 years of age were examined in the schools of Bauxite. Mottled enamel of some teeth were found in 202 cases, or 44 per cent. In evaluating this percentage it is necessary to recall again the immunity of temporary teeth and also to consider the imported individuals, by which we mean those persons who had grown the enamel on such permanent teeth as were erupted at the time of the examination elsewhere, before becoming residents of Bauxite. If some local condition at Bauxite were responsible for the defect, such enamel would of course be normal. The complete picture could be revealed only by being able to see the condition of the unerupted permanent teeth of these native children and similar teeth of the imported individuals upon which the enamel had been grown in Bauxite.

TABLE 1.—*Condition of the enamel in children who were born in Bauxite, Ark., and had lived there all their lives, using municipal deep-well water supply*

Age in years, at time of examination	Total number of children	First group				Second group			Third group		
		Mottled but not stained	Mottled and stained	Normal	Not erupted	Mottled	Normal	Not erupted	Mottled	Normal	Not erupted
5	1	1						1			1
6	10	7	1	[1]1	1			10			10
7	15	11	2		2			15			15
8	10	7	3			2		8			10
9	8	4	4			2		6			8
10	4	2	2			1		3			4
11	2		2			2					2
12	2	1	1			2					2
13	7	2	5			7					7
14	3	1	2			3					3
15	1		1			1					1
16	1		1			1					1
17	1			[2]1		1					1
18	1	1				1			1		
Total	66	37	24	2	3	23		43	1		65

[1] City water available in house but was not used for cooking or drinking.
[2] City water available in house but used spring water for drinking most of the time.

Table 1, presenting data on children who were born in Bauxite, gives the age of the individual at the time of examination, the number of children for each age, and the condition of the enamel of the first, second, and third groups of permanent teeth. There were 66 children in this group who were born in Bauxite. Of these, 63 had permanent teeth erupted and 61 had mottled enamel of the first group of permanent teeth. Three children had no permanent teeth erupted, and only two children had normal enamel of the permanent teeth.

One will note that the ages of the children of this group ranged from 5 to 18 years, and 43 of them had not erupted their second group of permanent teeth. The 23 children who had their second group of permanent teeth had mottled enamel of these teeth. The one child of 18 years, who had erupted the third molars, had mottled enamel of all his teeth.

There were two children with normal enamel of the first permanent group. One of these was 6 years of age, and his second group of permanent teeth had therefore not erupted; the other was 17 years of age and showed only slight mottling of his second group of permanent teeth. The 14-year-old sister of this second case had definite mottling of all her permanent teeth. These two families had access to spring water as well as to the central supply.

Table 2.—*Mottled enamel of the first group [1] of permanent teeth, among children in Bauxite, Ark.*

Ages between birth and 6 years during which child lived in Bauxite and used municipal deep well water supply	All ages	Age at time of examination																
		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Birth to 6 or over:																		
Total examined	77	10	12	11	11	5	3	3	8	5	2	3	3	1	---	---	---	---
Numbered mottled	75	9	12	11	11	5	3	3	8	5	2	3	2	1	---	---	---	---
Under 2 to 6 or over:																		
Total examined	16	1	4	2	3	1	4	1	---	---	---	---	---	---	---	---	---	---
Number mottled	16	1	4	2	3	1	4	1	---	---	---	---	---	---	---	---	---	---
2 to 6 or over:																		
Total examined	21	2	4	1	---	3	---	2	3	1	1	1	1	2	---	---	---	---
Number mottled	16	2	2	1	---	3	---	1	3	---	1	1	1	1	---	---	---	--
3 to 6 or over:																		
Total examined	24	3	4	3	2	2	2	---	2	---	4	2	---	---	---	---	---	---
Number mottled	12	1	1	2	---	2	2	---	---	---	2	2	---	---	---	---	---	---
4 to 6 or over:																		
Total examined	26	---	3	2	5	---	4	7	---	2	---	---	1	---	---	1	---	1
Number mottled	10	---	---	2	2	---	---	5	---	---	---	---	---	---	---	1	---	---
5 to 6 or over:																		
Total examined	22	3	2	3	1	1	1	1	3	1	3	3	---	---	---	---	---	---
Number mottled	2	---	---	---	---	1	---	1	---	---	---	---	---	---	---	---	---	---

[1] First group consists of first molars, incisors, and first bicuspids.

This table shows the condition of only the first group of permanent teeth, by age of the child at the time of examination, and the ages between birth and 6 years during which the children lived in Bauxite, and used the municipal deep well water supply.

There were a total of 77 children who lived in Bauxite from birth to 6 years or more of age. Of these, 75, or 97.4 per cent, had mottled enamel of the first group of permanent teeth in some degree. Of 16 children who lived in Bauxite from under 2 years of age to 6 years or over, all had mottled enamel. Of 21 children who lived there from 2 years of age to 6 years or over, 16, or 76 per cent had mottled enamel. Of 24 children who lived there from 3 years of age to 6 years or over, 12, or 50 per cent, had mottled enamel. Of 26 children who lived there from 4 years of age to 6 years or over 10, or 38.5 per cent, had mottled enamel. Of 22 children with residence in Bauxite from 5 years of age to 6 years or over, only 2, or 9 per cent, had mottled enamel in some degree of the first group of permanent teeth. The enamel of these teeth is considered to be developed from sometime in the first year of life to about the sixth or seventh year. There is a definite relation between the time lived in Bauxite between birth and 6 years of age and the condition of the enamel. The fact that two children who arrived in Bauxite at 5 years of age had defective enamel indicates that the time of the development of enamel is subject to some variation. Of course there is the possibility that these children developed defective enamel before their arrival in Bauxite.

The definite decrease in these percentages, however, is striking, ranging from 100 per cent down to 9 per cent, and furnishes what seems to be the most reliable index to what is, after all, the remarkable uniformity in the rate of development of the teeth according to age.

Table 3.—*Mottled enamel of the second group*[1] *of permanent teeth among children in Bauxite, Ark.*

Ages between birth and 9 years during which child lived in Bauxite and used municipal deep-well water supply	All ages	Age at time of examination													
		9	10	11	12	13	14	15	16	17	18	19	20	21	22
Birth to 9 or over:															
Total examined	28	2	1	3	3	7	5	2	2	2	1				
Number mottled	28	2	1	3	3	7	5	2	2	2	1				
Under 2 to 9 or over:															
Total examined	4			3	1										
Number mottled	4			3	1										
2 to 9 or over:															
Total examined	10		1		2	3	1		1	1	1				
Number mottled	10		1		2	3	1		1	1	1				
3 to 9 or over:															
Total examined	11		1	2		2		4	2						
Number mottled	9		1	2		1		3	2						
4 to 9 or over:															
Total examined	15	3		2	3		4			1			1		1
Number mottled	14	2		2	3		4			1			1		1
5 to 9 or over:															
Total examined	9			1		3	1	3	1						
Number mottled	5					3		2							
6 to 9 or over:															
Total examined	12			2	1	2	6			1					
Number mottled	7			2	1	2	2								
7 to 9 or over:															
Total examined	14		1	2	2	2	2	2		1		1			1
Number mottled	3		1	1		1									
8 to 9 or over:															
Total examined	8		3		1		1	1		1	1				
Number mottled			1												

[1] Second group consists of second bicuspids, cuspids, and second molars.

Table 3 shows the condition of the enamel of the second group of permanent teeth with the age of the child at the time of examination and the ages between birth and 9 years or over during which he had lived in Bauxite.

A total of 28 children lived in Bauxite from birth to 9 years of age, and all of these children had mottled enamel of the second group of permanent teeth. Four children had lived there from under 2 years of age to 9 years or over, and all had mottled enamel of the second group. There were 10 children with Bauxite residence from 2 years of age to 9 years or over and all had mottled enamel of the second group.

The percentage of defective enamel of the second group with residence from 3 years of age, 4 years, 5 years, 6 years, 7 years, and 8 years of age to 9 years or over, was respectively as follows: 81 per cent, 93 per cent, 55 per cent, 58 per cent, 21 per cent, and 12 per cent.

The condition of the third group of permanent teeth is of great interest. This group consists only of the third molars, or "wisdom teeth." These teeth are supposed to calcify from about 9 years to 14 years of age.

According to the evidence bearing upon the influence of the environmental factors in the etiology of mottled enamel, the third molars of a child coming into an endemic district after the age of 8 or 9 would present the typical lesion and the remainder of the teeth (formed elsewhere) would be normal.

TABLE 4.—*Condition of the enamel of the teeth of 14 persons with third molars erupted, Bauxite, Ark.*

Number of years lived in Bauxite—used municipal deep-well water supply	Age arrived in Bauxite	Present age	Condition of the teeth: First permanent group: Mottled	First permanent group: Stained	Second permanent group: Mottled	Third molars: Mottled
18	4	22	Normal	Normal	Mottled	Mottled.
18	(1)	18	Slightly mottled	do	Slightly mottled	Slightly mottled.
12	7	19	Normal	do	Normal	Mottled.
11	6	17	do	do	do	Slightly mottled.
10	8	18	do	do	do	Mottled.
8	12	20	do	do	do	Do.
8	10	18	do	do	do	Do.
8	7	15	do	do	do	Do.
7	12	19	do	do	do	Do.
7	8	15	do	do	do	Do.
6	12	18	do	do	do	Normal.
2	11	[2] 13	do	do	do	Mottled.
(3)	(3)	17	do	do	do	Normal.
2	13	[4] 15	do	do	do	Do.

1 Birth.
2 Now 17 years of age; attended Bauxite school from 13 to 17 years of age; living near Bauxite.
3 Never lived in Bauxite but attended Bauxite school from 6 to 17 years of age; living near Bauxite.
4 Now 19 years of age and living in Benton.

We were able to examine 14 people from 15 to 24 years of age who had lived in Bauxite two years or more during the time of calcification of the third molars.

Table 4 presents the age arrived in Bauxite, present age, number of years lived in Bauxite, and the condition of the enamel of the third molars. These 14 cases will be considered individually as the data appear of importance in etiological evidence.

The first of these persons came to Bauxite at 4. He lived there 18 years. The enamel of the first group is normal; that of the second and third groups is mottled. This is a typical case. The next was born in Bauxite and had lived there all his life. The enamel of all his teeth was mottled. The third lived in Bauxite from his seventh to nineteenth year. His first and second groups of teeth are normal, but the third molars are definitely mottled. The fourth arrived in Bauxite in his sixth year and has defective enamel of only the third molars. Why these first groups escaped in these two children is not clear. The next eight of these persons came to Bauxite when they were from 8 to 12 years of age. These children show normal enamel of the first and second groups, but defective enamel of the third molars, except in the case of one who arrived there in his twelfth year. One child who attended school in the village from his sixth to seventeenth year, but did not live in the village, had normal enamel. The other one arrived in Bauxite at 13 years of age, and the enamel was normal.

The data seem to indicate that the enamel of the third molars is usually defective if the individual had entered the endemic center any time up to 11 years of age. This uniform peculiarity in the behavior of the development of the enamel of the third molars in individuals who come into these endemic districts after the age of ten or eleven is considered by us as evidence pointing to the etiology of this condition. As has been shown in previous examinations it can be stated that apparently any enamel in the process of formation during residence in an endemic district will be found to be definitely mottled, due to some influence which operates exclusively in such a district. It seems highly probable that the water and not the food supply of these districts contains the influence responsible for mottled enamel, since we can scarcely assume that an individual coming into such a district suddenly acquires a new (and defective) food habit that deprives the growing enamel of precisely the elements, either in quantity or quality, necessary to its normal development. Such an assumption would imply that each individual had acquired identically the same defective food habit.

It should also be stated that enamel grown elsewhere (in non-endemic districts) and, hence, normal, undergoes no change whatever so far as observation shows, and certainly it never becomes in the slightest degree mottled, upon exposure in an endemic region.

The question of staining of the defective enamel has not been settled satisfactorily. This should not be confused with the mottling of the enamel, which is definitely known to occur during the developmental period. The percentage of mottled enamel that is stained increases from 10 per cent among 6 and 7 year old children to 67 per cent among children 13 years of age or older. Staining apparently develops and increases with age. No one has ever removed the upper central permanent teeth before eruption, and the question of time of staining will never be definitely settled until this is done. A post mortem would provide the opportunity, but it is a difficult problem to obtain consent for necropsy.

TABLE 5.—*Proportion of children with mottled enamel on the first group of teeth whose first group is also stained*

Present age of child	Total number with first permanent group mottled	Number mottled but not stained	Number mottled and stained	Percentage of all mottled cases that are stained also	Percentage by groups
All ages	167	94	73	43.7	
5	1	1			
6	15	14	1	6.7	10.0
7	24	21	3	12.5	
8	22	17	5	22.7	38.9
9	19	8	11	57.9	
10	14	6	8	57.1	
11	13	4	9	69.2	56.1
12	14	8	6	42.9	
13	14	6	8	57.1	
14	10	4	6	60.0	66.7
15 or over	21	5	16	76.2	

There is no evidence to indicate that in any community has there ever been observed any waning of this deleterious influence through any natural chemical or other alterations of its water supply.

There is the possibility of artificial chemical alteration of the water through certain "treatments" employed commercially, but naturally such a procedure would assume knowledge of the exact chemical nature of the damaging ingredient, and this knowledge is as yet undetermined.

To serve as a check on the children of Bauxite, 124 children were examined in the school at Benton, a town about 5 miles from Bauxite.

Of these 124 children, 103 were native to Benton (or other communities exclusive of Bauxite) and none presented anything but normal enamel. The remaining 21, ranging from 11 to 19 years of age, had formerly lived at Bauxite for longer or shorter periods. Sixteen of this group had lived in Bauxite for one year or more, and 11 of these had mottled enamel.

TABLE 6.—*Mottled enamel of teeth of children living in Benton, Ark., who formerly lived in Bauxite*

Case No.	Number of years lived in Bauxite and used municipal deep well water supply	Age at time of examination	Age on arrival in Bauxite	Age on leaving Bauxite (years)	Condition of the teeth			
					First permanent group		Second permanent group	Third molars
					Mottled	Stained		
1	12	16	Birth	12	Sl. mottled	Normal	Mottled	Not erupted.
2	12	14	do	12	Mottled	do	do	Do.
3	9	11	Under 6 months	9	do	do	do	Do.
4	8	18	7 years	15	Normal	do	Normal	Do.
5	8	13	Birth	8	Mottled	do	Mottled	Do.
6	7	14	4 years	11	Normal	do	do	Do.
7	5	18	do	9	do	do	Sl. mottled	Do.
8	5	17	7 years	12	do	do	Normal	Do.
9	4	19	2 years	6	Mottled	Sl. stained	Mottled	Do.
10	3	15	4 years	7	Normal	Normal	do	Do.
11	2	19	13 years	15	do	do	Normal	Normal.
12	2	16	5 years	7	Sl. mottled	Stained	Mottled	Not erupted.
13	2	16	9 years	11	Normal	Normal	Normal	Do.
14	2	15	7 years	9	Doubtful	do	Mottled	Do.
15	2	13	do	9	Normal	do	Normal	Do.
16	1	15	6 years	7	do	do	do	Do.
17	(1)	12	do	6	do	do	do	Do.
18	(1)	14	5 years	5	do	do	do	Do.
19	(1)	15	2 years	2	do	do	do	Do.
20		13	Unknown	(2)	Mottled	do	Mottled	Do.
21		13	do	(2)	Normal	do	Normal	Do.

[1] Less than 1 year. [2] Unknown.

The first, second, and fifth children included in Table 6 were born in Bauxite, and left there at 12, 12, and 8 years of age, respectively. The enamel of the teeth of both groups was mottled.

The third and ninth children arrived in Bauxite within the first two years of life, and the enamel of the teeth of both groups was mottled.

Three children (Nos. 6, 7, 10, in Table 6) arrived at Bauxite at 4 years of age and remained there until 11, 9, and 7 years of age, respectively. These children had normal enamel on the first group of teeth, but the second group was mottled.

The twelfth child arrived at 5 years of age and left at 7. The enamel of the first group of teeth was slightly mottled, but that of the second group was definitely so.

Four children (Nos. 4, 8, 14, and 15) arrived at 7 years of age and left at 15, 12, 9, and 9 years of age, respectively. Only one of these (No. 14) had mottled enamel. This was a typical case, the enamel of the first group of teeth being doubtful, but that of the second group was definitely mottled.

The other children had been in Bauxite only 1 year or less, or the time was unknown, and had normal enamel.

McKay, without previous information, was able during the examination to pick every Bauxite child, by reason of the defect, from among the Benton children.

The effect of Bauxite environment on the enamel development in families, shown in Table 7, is of interest.

TABLE 7.—*Mottled enamel of teeth of children of the same family, Bauxite, Ark.*

	Number of families having the specified number of children who were examined					
	One child examined	Two children examined	Three children examined	Four children examined	Five children examined	Six children examined
No children with mottled enamel	82	32	13	5	1	1
One child with mottled enamel	69	4	4	2		
Two children with mottled enamel		30	3	5	1	
Three children with mottled enamel			7	3		
Four children with mottled enamel				3		
Five children with mottled enamel						1

One family with four children, aged 17, 15, 13, and 8, shows the following history:

The 8-year old was born in Bauxite, but had been away 19 months after he was one year old. The incisors showed an interesting distribution of the mottling in that in the central portion of the teeth, from mesial to distal, was a band of normal enamel bounded above and below by a mottled area reflective of the periods spent in and away from Bauxite.

The 13-year old child was born in Bauxite and showed mottled enamel of all her permanent teeth, with slight staining of the upper centrals.

The 15-year old came to Bauxite at 2 years of age, left when he was 8 years old, and returned when he was 10. All his permanent teeth were mottled and the upper centrals were stained.

The oldest child is now 17. He entered Bauxite when 4 years old, left at 10, and returned at 12 years of age. His first group of permanent teeth were normal, having grown the enamel before coming to Bauxite. The second group, the enamel of which was grown in Bauxite, was definitely mottled.

Another interesting case is that of a girl of 12 years of age who came to Bauxite between 3 and 4 years of age. The enamel of the first group showed a slight band of mottling near the gums, the remainder of the tooth being normal, and the enamel of the second group was typically mottled. The band of mottled enamel on the first group was grown in Bauxite.

The extraction of a loose temporary molar from the mouth of a native Bauxite child afforded an opportunity of observing that the underlying bicuspid was typically mottled prior to any exposure to mouth conditions.

The data gathered in this survey indicate that there is a specific agent or condition in the environment of the village of Bauxite which interferes with the development of the enamel of the permanent teeth and is but a repetition of the information collected by McKay in his previous studies. This agent or condition is strictly limited to the village, because children in the immediate vicinity of the village are not affected. It does not seem probable that this agent can be in the food, because the mode of life and the diet of these people are the same in the village as outside the village. It attacks the children of well-to-do families as well as those of lower economic status. Physical condition seems to be of no importance; as far as can be seen the only requirement is the use of water from the central deep well supply.

The evidence brought out by this examination at Bauxite, together with similar evidence as to other districts, was responsible for the taking of immediate steps for the abandonment of the then existing deep well supply and the substitution of another source. The absence of this enamel defect in the children native to the neighboring town of Benton led to the drawing upon its source of water supply, which is the Saline River, and adapting it to the domestic needs of Bauxite. This involved piping the river water about 4 miles and passing it through a filtration plant before turning it into the distributing pipes. This change was effected shortly after the time of this study; and it is pointed out, as a matter of interest, that Bauxite is apparently the second community in the world to abandon an otherwise satisfactory water supply and substitute another solely because it apparently caused this dental defect. The first community to make such a change was Oakley, Idaho, an account of which was given in *Dental Cosmos*, September, 1925.

The fairly stable populations of these localities will, within six or seven years, afford an opportunity for observing the influence of the new water supply upon enamel grown subsequent to the change and determine the validity of the indictment of the former supply. No other material changes in the food habit or mode of living are likely to occur. A second survey will be undertaken at an appropriate time in each of these two communities.

Following is a report of analyses of samples of both the old "deep well" water and the new "filtered" water of Bauxite made by the Division of Chemistry of the National Institute of Health.

Surgeon Kempf requested that these waters be examined particularly for manganese. Traces of manganese were found in both of these samples of the order of magnitude of approximately 0.04 parts per million.

The analyses for the more common constituents resulted as follows:

	Deep well water	Filtered water		Deep well water	Filtered water
	Parts per million	*Parts per million*		*Parts per million*	*Parts per million*
Total residue on evaporation	1,003.0	86.00	Iron and aluminium oxides	1.0	0.3
Loss on ignition	43.0	14.00	Calcium (Ca)	25.3	17.6
Fixed residue	960.0	72.00	Magnesium (Mg)	7.0	2.1
Chloride (Cl)	415.9	3.75	Sodium (Na)	344.6	9.6
Sulfate (SO_4)	39.6	15.70	Potassium (K)	9.2	3.4
Nitrogen as nitrate (NO_3)	.3	.03	Alkalinity (phenolphthalein)	1.0	.0
Silica (SiO_2)	18.6	6.00	Alkalinity (methyl orange)	213.7	52.0

The determination of the manganese content of these waters is held to be of value only with regard to the possibility of its being the factor accounting for the "brown stain" as noted previously in this report. It is not thought to be associated with the general disruption of the orderly or normal arrangement of the integral enamel structure as indicated by the term "mottled."

It will be noted that there is a decided difference in the chemical structure of these two waters, principally in that the "deep well water" is a sodium bicarbonate water while the "filtered water" is a calcium bicarbonate water, as computed by Mr. W. D. Collins, chemist in charge, quality of water division, U. S. Geological Survey.

The table given below is taken from an article published in *Dental Cosmos*, in 1916, by Black and McKay, showing analyses of waters from various endemic districts studied at that time and is inserted here for purpose of comparison.

Table of analyses of water from various endemic districts

[Given in parts per million]

Constituents	Mine water at V	Lawson Ranch well water	Schole's well	Mine water at E	Single Ranch spring	City water at L	City water at B
Sodium	276.77	207.80	242.70	37.12	----------	3.30	6.21
Potassium	----------	3.35	6.44	----------	11.05	----------	----------
Calcium	89.75	31.80	33.31	74.50	21.32	5.70	23.44
Magnesium	27.36	37.75	33.60	16.71	5.41	1.70	Tr.
Iron	Nil	----------	3.35	Tr.	----------	.49	1.95
Aluminum	2.74						
Chlorin	47.37	31.00	51.00	14.17	8.31	7.29	4.82
Sulphuric acid	651.49	142.40	250.00	104.66	46.80	7.10	----------
Carbonic acid	216.78	615.00	530.00	239.60	22.80	15.30	----------
Silicic acid	16.68	21.65	18.12	----------	----------	7.50	6.45

These analyses throw no light whatever on the probable causal agent. The enamel defect occurs where waters of extremely low as well as of extremely high mineral content are used.

It would seem logical and would be highly desirable that animal experimentation be undertaken in some pronounced endemic district under strict water and dietary control, which would be expected to indicate definitely whether or not the water carries some deleterious agent, or lacks something necessary for the normal growth of the enamel. In this respect it is again brought out as in previous publications by one of us (McKay), that thus far in this investigation this lesion of the enamel had never been reliably reported as occurring in animals.

Various animal feeding experiments have been conducted by Howe and Pierle and others, in which structural damages have been brought about in the bony and certain dental tissues by severe dietary restrictions in the experimental animals, but the reproduction of this specific lesion of the enamel in any of these experiments has, to our knowledge, never been accomplished.

There is some question, then, as to what animal could be most successfully used for this purpose. Kempf suggests the pig; possibly the dog. Without any definite indication it would seem that the experimental animal would best be one in which the period of enamel growth was projected over a period of time corresponding as nearly as possible to that of the human.

No definite conclusions can be deduced at the present time other than that this enamel dystrophy occurs in certain areas in the United States, and the etiological factors seem to be definitely associated with the water supply of these areas. Exposure of a child, during permanent enamel growth, to the environmental factors in an endemic area appears almost certain to result in the development of mottled enamel.

The findings in this report have been compiled largely by one (Kempf) who has approached this survey from the standpoint of the trained investigator into conditions responsible for general human pathology, with no prejudice or influence from the dental standpoint.

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TRACHOMA

Some Facts About the Disease and Some Suggestions for Trachoma Sufferers

By Paul D. Mossman, *Surgeon, United States Public Health Service*

Trachoma, sometimes called "granulated eyelids" or "red sore eyes," is an inflammation of the lining of the eyelids. The early symptoms are watering, itching, and burning, or a feeling as if there were "something in the eye." Light causes pain in the eyes and the sufferer avoids the sunshine. The feeling of something in the eye is so marked that nearly every trachoma patient tells the doctor that his trouble was caused by getting dust, or sand, or pollen in his eyes. While the disease begins in the eyelids, sooner or later the eyeball usually becomes involved. The cornea, or transparent part of the eyeball, becomes clouded, and vision gradually gets poorer. In the course of the disease, scars form on the inside of the lid, and when these scars contract, or "draw", as all scars do, the edge of the lid is pulled inward causing the lashes to scratch on the eyeball. This not only causes pain but adds to the cloudiness of the eye, and partial or complete blindness often results.

Historical records indicate that even in ancient times trachoma was recognized and treated in many countries. It is not surprising, therefore, to find that with the exploration and settlement of new countries, this disease should have been carried to the far corners of the earth. Few, if any, countries are at present entirely free from it, and several have become particularly cursed by its widespread incidence.

It is estimated that 90 per cent of the native population in Egypt are sufferers from trachoma and that 25 per cent of the Chinese are so afflicted. Brazil, Syria, Ireland, and Russia are also among the countries which show a high degree of prevalence. Reports indicate a tremendous increase in trachoma in various countries of Middle Europe after the World War. This increase is attributed to the crowding and the generally depressed living conditions following the war.

Nobody dies from trachoma, and for that reason not many people become greatly alarmed about it, but it is deserving of serious consideration on account of the great amount of suffering and economic loss which it causes. The cost of medical care, the loss of earning power and the expense of blind pensions are a few of the economic items which are involved in this disease. A person with trachoma is almost certain to lose some vision. Some have to drop out of skilled trades because they do not see well enough to do close work, and they must then take up unskilled labor at a lower wage. Many more are totally incapacitated, either permanently or for varying periods, for performing any useful work at all. It has been stated that in China, where 25 per cent of the population have trachoma, this disease causes greater economic loss than floods or famine, both of which are notoriously destructive in that country. In the State of Missouri, 21.7 per cent of approximately 3,200 persons drawing State pensions because of total blindness were made blind by trachoma. This includes only persons totally blind in both eyes and represents a direct cost of nearly a quarter of a million dollars annually for pensions, to say nothing of the loss of earning power of these individuals.

Much has been said, and many theories have been proposed, to account for the undue prevalence of trachoma among certain peoples. Certain races have been said to be more susceptible than others. Altitude and climate have been accused of being predisposing factors. However, we observe trachoma in mountainous districts in our own country and in the plains of Egypt; in damp countries such as Finland as well as in dry and dusty Arabia. Poverty, overcrowding, insanitary living conditions, and malnutrition constitute perhaps the most potent factors in bringing about the prevalence of this disease.

Trachoma among the white population in the United States is not confined to any sharply defined area, but in general is prevalent in the States of West Virginia, Kentucky, eastern Tennessee and western Virginia, Missouri, Arkansas, and Oklahoma.

The inhabitants of these sections are largely of Anglo-Saxon stock, descendants of the early settlers. There has been little immigration from other sections and the percentage of foreign born is extremely low. There is also a fringe of territory along the Ohio River in Ohio, Indiana, and Illinois, peopled largely by settlers from the Appalachian region, where trachoma is found in some abundance. Of course, trachoma is not entirely absent in other sections of the country and it is not uniformly spread over the area above mentioned, where it is rather prevalent.

The percentage of trachoma among the American Indians varies in different tribes. Some tribes are almost free from it, while among others as many as 20 to 25 per cent have the disease.

Trachoma is spread from one person to another by getting the infective material from the eye of a person afflicted with trachoma into the eye of another person. This may happen by using the same towel, wash basin, handkerchief, or other articles that have been contaminated by a person with trachoma. It is also dangerous to shake hands with a person who has trachoma, because of the likelihood that he may have infective material on his hands. Nor is it safe to sleep in a bed with a person who has trachoma.

Likewise, the person who has trachoma should recognize his responsibility in the protection of others. He should not use towels, basins, or other articles which might become contaminated and then leave them for others to use.

A person who knows or suspects that he has trachoma owes it to himself and to the people around him to have his eyes treated. There are two excellent reasons for this: First, to relieve his distress and prevent loss of vision; and, second, to keep from spreading the disease to others. Trachoma would not spread far if every person who now has it would have his eyes treated persistently by a competent physician. It often takes a long time to arrest the disease completely, but the patient is wise who continues treatment until he is pronounced well.

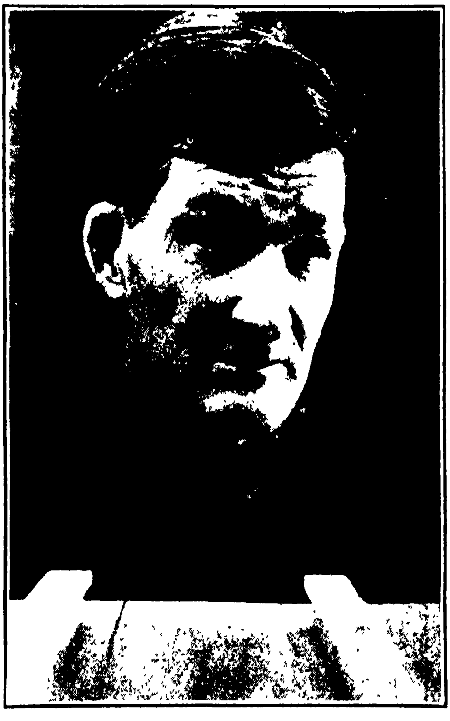
Surgeon John McMullen, of the United States Public Health Service, after making an extensive survey of the prevalence of trachoma in eastern Kentucky, in 1912, evolved the plan of establishing small hospitals which were designed not only to treat trachoma but to serve as centers for field work in the form of surveys, field clinics, and educational work. This plan for the study, prophylaxis, and treatment of trachoma, with some modifications, is still being followed by the United States Public Health Service in cooperation with the States concerned.

From the standpoint of eradication, it is the aim to treat as many cases as possible, to persuade as many sufferers as possible to seek treatment, not only in these hospitals, but from private specialists,

Trachoma patient on admission

On discharge, 2 months later. Able to return to school, but some permanent damage to right eye

Entropion. Lashes have been pulled out by patient to relieve pain caused by their scratching



Advanced case, showing entropion

Trachoma. Note droop of right upper lid

Girl, aged 9, with perforation of right cornea. No vision in right eye, and vision in left eye badly impaired

Group of patients at a trachoma hospital

and to instruct the patients and their associates in personal hygiene as a means of preventing the spread of the disease. By giving adequate treatment to a considerable number of sufferers, the number of foci for the spread of the disease will be correspondingly reduced.

One of the difficulties in this campaign is the fact that so many sufferers regard trachoma as absolutely incurable and do not consider it worth while to take treatment. They stoically suffer the itching, burning, lachrymation, and photophobia which accompany all cases and even the intense pain and the disability due to complications, such as corneal ulcers, iritis, and pannus. They grow tired of the prolonged treatment which is necessary in most cases in order to get any permanent benefit and are usually too poor to pay for any adequate private treatment, even if they were willing to persist in it. Then too, it is apparently hard for many of them to understand why these strange "Government" doctors and nurses should be so anxious to treat them free of charge unless there is some "string to it." Patience and tact are necessary, as well as the evidence of honest and careful treatment, before the hospital can become widely popular.

In addition to maintaining the hospitals, field clinics are held at various points in the infected areas, where persons with symptoms resembling those of trachoma are invited to come for examination, advice, and treatment. The cases are found in all stages of the disease, many in the terminal stage without active granulation and requiring no treatment unless the distressing and damaging sequelæ of the disease, entropion and trichiasis, are present. These clinics are conducted with the active cooperation of State or local health authorities. Known cases and suspects found by school medical examinations and by home visits by the field nurses are urged to attend the clinic and various means of advertising are used. Examinations and diagnoses are made at the clinics and appropriate advice is given patients. Selected cases are treated, usually the milder or earlier ones. Others are advised to seek treatment at the hospital or from private specialists if the latter are accessible. An effort is made to do as much instructive work at the clinics as time and opportunity permit. The usefulness of the clinics does not depend alone on the number of operations performed, for only a limited number of selected cases are suitable for treatment with the facilities available where the clinics are held. An important feature of the clinic is that it gives an opportunity for the patient to have a careful examination and diagnosis and for the doctor to give instruction and advice and establish contact with the patient, so that when the patient is advised to go to the hospital he is already acquainted with the doctor and nurse who will care for him there. This establishes confidence and is a necessary factor in dealing with these people who have a dread of going away from home. The clinics also afford an opportunity of getting some idea of the prevalence of

the disease in different localities. Although the disease is reportable in many States, it is not commonly reported even in sections where it is quite prevalent.

A disease that is so resistant to treatment as trachoma is bound to be the subject of innumerable remedies, many of which have little or no merit. The treatment used in Public Health Service hospitals is mainly surgical, though supplemented by appropriate medicinal agents, and has been pretty carefully worked out. We are continually on the lookout, however, for better methods; and new methods, as they appear, are given careful consideration and, if deemed worthy, a fair trail. If and when the ideal treatment is found, it will have two essential elements—certainty and rapidity of cure.

In correlation with the field and hospital campaign against trachoma the Public Health Service is conducting a research laboratory at Rolla, Mo., where a highly trained bacteriologist is carrying on investigations with a view to determining the bacterial cause of the disease.

While the prevalence of trachoma in this country is extremely small as compared with that in Egypt, China, and many other countries, it constitutes in certain parts of America a distinct problem and demands immediate and constant attention lest the number of damaged eyes due to the disease should become even greater than at present.

ADVICE TO PERSONS WITH TRACHOMA

1. Place yourself under treatment by a reputable physician without delay—a specialist if possible. Continue treatment until the physician dismisses you.
2. Do not be discouraged if your doctor fails to cure you in a few weeks. Many cases of trachoma require treatment off and on for two or three years.
3. Keep your face clean, especially about the eyes.
4. Have clean handkerchiefs or clean cloths to wipe your eyes with. See that they are boiled or burned after use.
5. Do not leave your towel, soap, or wash basin where other persons can use them, or they may also get trachoma.
6. Babies may contract trachoma; so be careful in cleaning the baby's eyes to use wash rags that have been boiled.
7. Persons with trachoma should not be exposed to dust. However, if you must work in a dusty place, dust goggles will give you some protection. Wear them only when working in the dust.
8. Remember that the wearing of dark glasses continuously tends to weaken the eyes. Wear them only when you are in bright sunshine.
9. Glasses will not cure trachoma. Do not let anyone sell you glasses in the hope that they will cure your condition.

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for September, 1930

The accompanying table, taken from the Statistical Bulletin for October, 1930, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for September, 1930, as compared with that for the preceding month and for the corresponding month of last year. It also gives the cumulative rates for the period January–September for the years 1930 and 1929. These rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada.

The Bulletin states:

The September death rate (7.8 per 1,000) was a little higher than the figure recorded for either September, 1929, or August, 1930. For policyholders living west of the Rocky Mountains, however, the September mortality rate was lower than that in evidence last year. In the remainder of the United States the 1930 figure for this month was 7.9 per 1,000 as compared with 7.7 in 1929, and in Canada it was 8.9 as against 8.7 The cumulative death rate for the January–September period was markedly lower in all sections of both countries this year than last.

Death rates (annual basis) per 100,000 for principal causes of death, August, 1930

[Industrial department, Metropolitan Life Insurance Co.]

Cause of death	Rate per 100,000 lives exposed [1]				
	September, 1930	August, 1930	September, 1929	Cumulative, January–September	
				1930	1929
Total all causes	782.8	751.3	768.0	880.4	963.4
Typhoid fever	4.1	3.2	3.2	2.0	2.2
Measles	.6	.6	.5	3.5	3.6
Scarlet fever	1.1	1.1	1.0	2.7	2.8
Whooping cough	4.6	5.4	5.0	4.7	6.3
Diphtheria	2.7	3.0	5.0	5.8	8.3
Influenza	5.5	3.3	4.4	15.6	50.3
Tuberculosis (all forms)	72.8	71.6	70.6	82.9	89.8
Tuberculosis of respiratory system	63.9	62.3	61.8	71.9	79.4
Cancer	78.9	73.6	74.8	76.6	77.5
Diabetes mellitus	15.8	16.1	13.7	18.5	18.9
Cerebral hemorrhage	54.5	53.7	[2] 45.9	60.1	[2] 58.1
Organic diseases of heart	121.6	112.7	115.3	145.2	150.5
Pneumonia (all forms)	34.5	29.4	33.5	79.0	95.6
Other respiratory diseases	8.8	8.3	8.9	11.3	12.5
Diarrhea and enteritis	40.2	32.2	46.3	19.1	20.7
Bright's disease (chronic nephritis)	59.1	58.6	56.5	68.0	70.4
Puerperal state	10.4	10.8	11.0	12.5	13.9
Suicides	9.5	9.3	8.6	9.6	8.7
Homicides	7.4	6.3	5.7	6.5	6.4
Other external causes (excluding suicides and homicides)	64.5	75.6	67.4	62.9	64.5
Traumatism by automobiles	23.7	22.4	22.5	19.8	19.2
All other causes	186.2	176.7	190.5	193.8	202.5

[1] All figures in this table include insured infants under 1 year of age. The rates for 1930 are subject to slight correction, as they are based on provisional estimates of lives exposed to risk.
[2] Rate not comparable with that for 1930.

COURT DECISION RELATING TO PUBLIC HEALTH

Bovine tuberculosis law held constitutional.—(Iowa Supreme Court; Loftus et al. *v.* Department of Agriculture of Iowa et al., 232 N. W. 412; decided Sept. 22, 1930.) The plaintiffs, owners of dairy and breeding cattle, brought an action to enjoin the State department of agriculture and certain State and county representatives from enforcing the law pertaining to the control and eradication of bovine tuberculosis. It was claimed by plaintiffs that the said law was unconstitutional and void. By the law the State was established as an accredited area for the eradication of tuberculosis from cattle, quarantine was authorized, tuberculous cattle could be destroyed or otherwise disposed of by the agricultural department, inspectors or testers were arranged for, and these agents could apply the tuberculin or other tests to determine the existence or nonexistence of tuberculosis in cattle. The basis for the contention of unconstitutionality was that the legislation did not provide due process of law, permitted an unreasonable exercise of the police power, allowed arbitrary action by the enforcing officers, authorized the administrative department to unlawfully enact and enforce rules, was not uniform in its operation, combined in one testing agent the duties of administrative and judicial officers, and otherwise was repugnant to the State and Federal Constitutions. The supreme court, in reversing the action of the trial court in granting an injunction, held that the legislation under consideration was within the police power of the State and constitutional.

DEATHS DURING WEEK ENDED NOVEMBER 8, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended November 8, 1930, and corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

	Week ended Nov. 8, 1930	Corresponding week, 1929
Policies in force	75, 344, 536	75, 039, 431
Number of death claims	11, 918	12, 086
Death claims per 1,000 policies in force, annual rate	8. 2	8. 4

Deaths [1] from all causes in certain large cities of the United States during the week ended November 8, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Nov. 8, 1930				Corresponding week 1929		Death rate [2] for first 45 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (78 cities)	7,783	11.7	715	[4] 57	11.7	658	11.9	12.7
Akron	38	7.8	1	9	6.4	7	8.0	9.3
Albany [5]	48	19.6	1	21	15.7	3	14.8	16.4
Atlanta	67	13.0	4	41	15.3	6	15.8	16.1
White	40	--------	1	16	--------	6	--------	--------
Colored	27	(6)	3	86	(6)	0	(6)	(6)
Baltimore [5]	245	15.9	43	150	12.3	19	14.0	14.6
White	180	--------	31	138	--------	11	--------	--------
Colored	65	(6)	12	192	(6)	8	(6)	(6)
Birmingham	74	14.9	9	87	16.6	6	13.7	16.1
White	37	--------	3	48	--------	0	--------	--------
Colored	37	(6)	6	147	(6)	6	(6)	(6)
Boston	221	14.7	20	58	13.5	30	14.1	15.0
Bridgeport	31	11.0	5	86	8.2	3	10.9	12.0
Buffalo	117	10.6	9	40	12.5	9	12.9	14.1
Cambridge	16	7.3	1	20	14.7	8	11.8	12.5
Camden	34	15.1	5	88	14.2	2	13.7	14.5
Canton	22	10.8	0	0	9.5	0	10.0	11.3
Chicago [5]	615	9.5	46	41	10.6	51	10.4	11.3
Cincinnati	138	16.0	9	53	15.8	14	15.6	17.1
Cleveland	198	11.4	23	69	12.1	19	11.1	12.5
Columbus	88	15.8	6	59	12.2	6	15.6	14.9
Dallas	69	13.7	12	--------	10.5	10	11.4	11.5
White	42	--------	6	--------	--------	6	--------	--------
Colored	27	(6)	6	--------	(6)	4	(6)	(6)
Dayton	41	10.6	2	30	9.0	0	10.7	11.5
Denver	87	15.7	14	153	12.8	11	14.8	14.8
Des Moines	32	11.7	0	0	7.4	3	11.7	11.6
Detroit	231	7.6	36	55	9.7	35	9.3	11.2
Duluth	21	10.8	0	0	12.9	6	11.4	11.6
El Paso	29	14.8	9	--------	23.3	7	17.2	19.6
Erie	24	10.8	1	22	6.4	1	11.2	12.1
Fall River [5] [7]	22	10.0	4	92	11.8	2	11.8	13.7
Flint	34	11.2	3	35	8.6	2	9.2	10.8
Fort Worth	33	10.7	3	--------	12.1	4	11.0	12.2
White	30	--------	3	--------	--------	4	--------	--------
Colored	3	(6)	0	--------	(6)	0	(6)	(6)
Grand Rapids	29	9.0	4	60	10.7	3	10.2	10.2
Houston	70	12.5	7	--------	12.8	10	12.2	12.7
White	52	--------	2	--------	--------	6	--------	--------
Colored	18	(6)	5	--------	(6)	4	(6)	(6)
Indianapolis	85	12.1	3	23	13.4	5	14.6	14.8
White	72	--------	2	17	--------	4	--------	--------
Colored	13	(6)	1	58	(6)	1	(6)	(6)
Jersey City	71	11.7	7	61	12.6	7	11.3	12.5
Kansas City, Kans	28	11.9	4	93	10.7	4	11.7	13 0
White	23	--------	3	83	--------	4	--------	--------
Colored	5	(6)	1	152	(6)	0	(6)	(6)
Kansas City, Mo	101	13.4	12	100	12.6	5	13.5	14.0
Knoxville	22	10.8	1	23	12.6	5	13.5	14.0
White	16	--------	1	26	--------	5	--------	--------
Colored	6	(6)	0	0	(6)	0	(6)	(6)
Los Angeles	278	11.6	22	67	11.9	23	11.1	11.3
Louisville	77	13.0	4	34	12.7	4	13.6	15.3
White	49	--------	3	30	--------	2	--------	--------
Colored	28	(6)	1	66	(6)	2	(6)	(6)
Lowell [7]	26	13.5	1	26	10.8	3	13.4	14.0
Lynn	14	7.1	2	56	13.3	1	10.3	11.3
Memphis	77	15.9	13	153	13.8	4	17.0	19.0
White	47	--------	7	126	--------	0	--------	--------
Colored	30	(6)	6	202	(6)	4	(6)	(6)
Milwaukee	118	10.8	15	66	10.4	16	9.8	11.0
Minneapolis	105	11.8	15	98	10.6	3	10.8	10.8

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended November 8, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929—Continued

City	Week ended Nov. 8, 1930				Corresponding week 1929		Death rate[2] for first 45 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Nashville	54	19.1	12	188	19.6	8	17.4	18.7
White	37	—	8	168	—	8	—	—
Colored	17	(6)	4	249	(6)	0	(6)	(6)
New Bedford [7]	23	10.6	1	23	10.6	0	10.9	12.1
New Haven	41	13.1	1	15	15.1	3	12.7	13.5
New Orleans	143	16.3	19	106	17.2	11	17.4	17.7
White	88	—	10	85	—	5	—	—
Colored	55	(6)	9	146	(6)	6	(6)	(6)
New York	1,354	10.1	115	48	10.0	109	10.7	11.3
Bronx Borough	194	7.9	12	35	7.3	21	7.9	8.3
Brooklyn Borough	462	9.2	40	42	9.3	34	9.7	10.2
Manhattan Borough	517	14.6	49	63	13.6	34	16.1	16.4
Queens Borough	152	7.2	13	52	7.2	14	7.0	7.6
Richmond Borough	29	9.6	1	19	14.9	3	14.2	16.0
Newark, N. J	92	10.8	8	42	10.3	11	11.9	12.7
Oakland	55	10.0	4	50	10.6	2	10.9	11.3
Oklahoma City	31	8.7	5	90	9.8	4	10.8	10.8
Omaha	60	14.6	5	61	10.8	1	13.5	13.6
Paterson	22	8.3	0	0	13.6	1	12.2	13.4
Philadelphia	454	12.0	36	53	13.1	37	12.5	13.2
Pittsburgh	199	15.5	19	67	16.0	23	13.8	14.8
Portland, Oreg	66	11.5	3	37	15.5	4	12.2	12.8
Providence	68	14.1	3	28	12.7	7	13.0	14.6
Richmond	57	16.2	10	145	16.0	6	14.8	16.3
White	32	—	4	88	—	3	—	—
Colored	25	(5)	6	256	(6)	3	(6)	(6)
Rochester	91	14.6	6	53	10.0	4	11.7	12.4
St. Louis	223	14.1	16	56	11.5	10	14.1	14.6
St. Paul	62	11.9	5	51	11.1	2	10.1	10.5
Salt Lake City [5]	34	12.6	7	111	13.6	2	12.4	13.0
San Antonio	52	10.6	8	—	15.6	10	14.6	14.5
San Diego	37	12.9	1	21	16.0	4	14.3	15.1
San Francisco	212	17.6	3	20	10.4	3	13.1	13.0
Schenectady	15	8.2	0	0	6.6	2	11.2	12.2
Seattle	76	10.9	2	20	11.2	1	10.9	11.2
Somerville	18	9.0	1	32	10.1	1	9.7	9.2
Spokane	34	15.3	1	26	11.3	1	12.5	12.7
Springfield, Mass	32	11.1	4	69	10.5	3	12.1	12.7
Syracuse	60	15.1	2	25	8.1	3	11.8	13.0
Tacoma	22	10.7	1	27	11.8	0	12.5	11.8
Toledo	71	12.7	5	46	10.7	7	12.7	13.7
Trenton	40	17.0	7	134	17.0	2	16.7	17.1
Utica	33	16.7	3	83	15.3	0	14.8	15.6
Washington, D. C	152	16.3	15	88	14.6	11	15.1	15.4
White	98	—	10	87	—	7	—	—
Colored	54	(6)	5	89	(6)	4	(6)	(6)
Waterbury	16	8.2	0	0	8.3	2	9.3	9.5
Wilmington, Del. [7]	22	10.9	3	72	13.4	1	14.5	13.9
Worcester	38	10.1	4	55	15.2	5	12.6	12.7
Yonkers	20	7.7	2	48	7.1	3	8.1	9.3
Youngstown	28	8.6	2	29	9.9	3	10.2	12.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended November 15, 1930, and November 16, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 15, 1930, and November 16, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929
New England States:								
Maine	7	4			15	13	1	0
New Hampshire		7		11		15	0	1
Vermont	3	5			11	4	0	0
Massachusetts	59	168	2	7	150	81	3	3
Rhode Island	6	15		1		3	0	0
Connecticut	9	28	1	6	67	2	1	0
Middle Atlantic States:								
New York	105	184	[1] 25	[1] 9	146	183	8	14
New Jersey	52	149	5	3	81	39	4	5
Pennsylvania	127	163			257	340	6	5
East North Central States:								
Ohio	86	94	22	14	17	116	6	5
Indiana	52	50	7		93	7	3	3
Illinois	162	253	3	14	91	180	9	4
Michigan	86	146		4	45	138	3	18
Wisconsin	19	29	21	5	112	308	6	3
West North Central States:								
Minnesota	16	33	2	2	17	38	2	1
Iowa	10	4			1	43	0	0
Missouri	76	85	7	2	247	16	2	7
North Dakota	5	3				26	5	2
South Dakota	6	5			2	6	0	0
Nebraska	16	30		2	5	47	0	0
Kansas	27	44	1		4	39	2	3
South Atlantic States:								
Delaware	4	2					0	0
Maryland [2]	33	22	17	16	2	29	0	2
District of Columbia	6	11	1		4	1	2	0
Virginia								2
West Virginia	21	42	34	11	10	17	0	0
North Carolina	134	204	5	6	5	2	4	2
South Carolina	57	48	547	782			1	0
Georgia	36	31	107	93	18	14	1	7
Florida	18	21	7	1	10	2	0	1
East South Central States:								
Kentucky		21			36		0	0
Tennessee	61	59	37	63	13	2	3	3
Alabama	118	63	36	47	43	20	2	4
Mississippi	53	64					4	0

[1] New York City only.
[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 15, 1930, and November 16, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929
West South Central States:								
Arkansas	19	18	21	21	2	------	0	2
Louisiana	30	65	11	14	1	3	2	0
Oklahoma [3]	58	69	44	56	14	9	1	0
Texas	61	164	10	43	26	2	0	1
Mountain States:								
Montana	1	1	------	------	1	55	3	3
Idaho	1	------	------	------	7	51	1	1
Wyoming	------	------	------	------	1	------	0	0
Colorado	10	8	------	------	46	4	0	3
New Mexico	3	27	------	------	8	------	1	0
Arizona	5	41	3	8	29	2	0	9
Utah [2]	1	1	6	3	------	25	1	5
Pacific States:								
Washington	10	13	------	------	10	22	4	1
Oregon	3	6	7	16	32	19	0	1
California	61	67	27	36	94	72	5	6

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929
New England States:								
Maine	3	0	20	26	0	0	13	1
New Hampshire	1	0	1	39	0	0	0	1
Vermont	0	0	1	5	0	3	0	1
Massachusetts	14	8	164	213	0	0	10	5
Rhode Island	0	0	18	16	0	0	0	2
Connecticut	2	1	38	52	0	0	3	2
Middle Atlantic States:								
New York	16	9	329	296	1	44	24	22
New Jersey	3	0	120	126	0	0	9	7
Pennsylvania	7	1	393	273	0	1	31	33
East North Central States:								
Ohio	52	6	435	252	58	162	27	19
Indiana	8	0	161	104	43	162	15	5
Illinois	15	3	376	456	14	128	16	14
Michigan	10	4	239	237	54	64	10	8
Wisconsin	13	2	93	92	3	25	7	11
West North Central States:								
Minnesota	11	0	56	86	9	4	5	3
Iowa	10	1	70	43	13	33	4	29
Missouri	4	1	95	95	3	25	10	9
North Dakota	2	0	9	15	11	11	3	0
South Dakota	8	0	7	10	13	11	2	0
Nebraska	15	1	29	38	24	16	2	0
Kansas	10	0	57	71	13	52	4	6
South Atlantic States:								
Delaware	0	0	17	2	0	0	2	1
Maryland [2]	1	1	57	64	0	0	40	6
District of Columbia	0	0	18	19	0	0	1	3
Virginia	------	2	------	------	------	------	------	------
West Virginia	1	1	33	74	4	8	28	18
North Carolina	0	3	143	145	0	4	8	8
South Carolina	2	2	19	28	4	0	26	20
Georgia	0	1	63	79	0	0	15	5
Florida	0	2	12	11	0	0	0	0
East South Central States:								
Kentucky	0	1	66	74	1	10	15	0
Tennessee	1	3	71	58	4	4	32	13
Alabama	3	2	77	68	0	203	42	6
Mississippi	0	0	26	30	0	0	20	3
West South Central States:								
Arkansas	0	0	8	25	19	2	33	7
Louisiana	0	0	30	23	1	0	31	11
Oklahoma [3]	0	0	46	58	0	9	32	25
Texas	3	0	41	32	15	6	17	7

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 15, 1930, and November 16, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929	Week ended Nov. 15, 1930	Week ended Nov. 16, 1929
Mountain States:								
Montana	0	0	32	27	1	16	2	8
Idaho	1	0	11	9	1	4	0	1
Wyoming	2	0	5	3	0	16	1	0
Colorado	4	0	34	18	2	14	7	5
New Mexico	1	1	5	12	0	2	5	8
Arizona	1	1	0	13	2	0	0	8
Utah [2]	0	0	10	5	0	0	0	2
Pacific States:								
Washington	0	2	38	38	14	42	9	10
Oregon	0	1	6	27	17	4	2	1
California	44	3	91	215	11	26	12	10

[1] Week ended Friday.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Cerebrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September, 1930										
Colorado	7	35			80		25	33	5	54
October, 1930										
Arkansas		46	73	147	3	108	12	48	11	131
District of Columbia	3	47	4		9		4	48	0	12
Michigan	32	275	10	3	181	1	75	554	53	101
New Jersey	6	278	27	3	160		12	336	0	44
New York	49	302		19	301		168	704	1	174
North Dakota		14	2		27		10	45	26	20
Ohio	16	321	56	3	73		317	1,266	68	241
Porto Rico		45	31	2,067	5	1	3		0	19

September, 1930 — Cases

Colorado:
- Chicken pox — 15
- German measles — 2
- Impetigo contagiosa — 1
- Mumps — 62
- Paratyphoid fever — 4
- Rocky Mountain spotted or tick fever — [1] 5
- Vincent's angina — 1
- Whooping cough — 132

October, 1930

Chicken pox:
- Arkansas — 26
- District of Columbia — 5
- Michigan — 521
- New Jersey — 263
- New York — 781
- North Dakota — 58
- Ohio — 859

Diarrhea and enteritis (under 2 years):
- Ohio — 107

Dysentery:
- New Jersey — 2
- New York — 69
- Ohio — .5
- Porto Rico — 15

Filariasis:
- Porto Rico — 1

Food poisoning: — Cases
- Ohio — 5

German measles:
- New Jersey — 15
- New York — 69
- Ohio — 13

Hookworm disease:
- Arkansas — 7

Lead poisoning:
- New Jersey — 9
- Ohio — 19

Leprosy:
- New York — 1

Lethargic encephalitis:
- District of Columbia — 1
- Michigan — 12
- New Jersey — 5
- North Dakota — 15
- Ohio — 7

Mumps:
- Arkansas — 6
- Michigan — 163
- New Jersey — 43
- New York — 307
- North Dakota — 25
- Ohio — 133
- Porto Rico — 6

[1] Delayed reports.

Disease and State	Cases
Ophthalmia neonatorum:	
Arkansas	4
New Jersey	3
New York	6
Ohio	89
Porto Rico	5
Paratyphoid fever:	
New York	6
Ohio	7
Porto Rico	7
Puerperal fever:	
New York	5
Ohio	5
Porto Rico	10
Rabies in animals:	
New York	4
Rabies in man:	
Michigan	1
New Jersey	1
Septic sore throat:	
Michigan	21
New York	16
Ohio	62
Tetanus:	
New Jersey	1
New York	8
North Dakota	1
Ohio	3
Porto Rico	4
Tetanus (infantile):	
Porto Rico	27
Trachoma:	
Arkansas	4
New York	6
North Dakota	2
Ohio	4
Porto Rico	1
Tularaemia:	
Ohio	2
Typhus fever:	
District of Columbia	1
New York	2
Undulant fever:	
New Jersey	5
New York	31
Ohio	7
Vincent's angina:	
New York	[1] 100
North Dakota	21
Whooping cough:	
Arkansas	14
District of Columbia	22
Michigan	405
New Jersey	289
New York	1,218
North Dakota	27
Ohio	201
Porto Rico	103

[1] Exclusive of New York City.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,945,000. The estimated population of the 90 cities reporting deaths is more than 30,390,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended November 8, 1930, and November 9, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
45 States	1,776	2,245	
96 cities	517	949	1,123
Measles:			
45 States	1,321	1,947	
96 cities	358	261	
Meningococcus meningitis:			
46 States	83	92	
96 cities	26	56	
Poliomyelitis:			
46 States	291	46	
Scarlet fever:			
46 States	3,307	3,458	
96 cities	1,055	1,152	930
Smallpox:			
46 States	237	675	
96 cities	15	45	22
Typhoid fever:			
46 States	699	456	
96 cities	67	54	64
Deaths reported			
Influenza and pneumonia:			
90 cities	661	650	
Smallpox:			
90 cities	0	0	

City reports for week ended November 8, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include serveral epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepedmic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	3	1	0		0	0	0	3
New Hampshire:								
Concord	0	0	0		0	0	0	0
Nashua	0	1	1		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	3	0	1		0	0	0	1
Massachusetts:								
Boston	33	30	19	1	0	23	6	18
Fall River	1	4	0		0	0	0	0
Springfield	29	4	8		0	1	2	0
Worcester	24	5	0		0	0	0	0
Rhode Island:								
Pawtucket	0	1	1		0	0	0	3
Providence	5	10	4	1	0	0	0	6
Connecticut:								
Bridgeport	0	6	1	2	1	0	1	3
Hartford		5						
New Haven	4	2	0		0	15	2	1
MIDDLE ATLANTIC								
New York:								
Buffalo	34	16	7		0	6	5	18
New York	91	152	39	11	11	29	16	154
Rochester	20	5	1		0	1	0	1
Syracuse	12	4	0		0	0	0	5
New Jersey:								
Camden	3	8	2	1	0	11	1	3
Newark	33	16	6	5	1	4	4	5
Trenton	1	2	0		1	1	0	2
Pennsylvania:								
Philadelphia	71	65	11	8	7	14	7	39
Pittsburgh	21	29	7		7	7	3	24
Reading	5	3	0		0	1	11	2
Scranton	3	6	1			3	2	
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	9	13	3		1	1	2	9
Cleveland	102	56	14	6	1	2	27	16
Columbus	23	8	4	1	0	1	0	4
Toledo	53	11	11		0	1	3	9
Indiana:								
Fort Wayne	4	5	2		0	0	0	4
Indianapolis	26	13	1		0	1	5	11
South Bend	9	2	4		0	3	0	1
Terre Haute	2	2	0		0	0	0	2
Illinois:								
Chicago	84	141	96	5	2	4	30	38
Springfield	0	1	1		0	0	0	1
Michigan:								
Detroit	93	69	44	2	3	2	11	17
Flint	17	6	3		0	7	3	4
Grand Rapids	8	3	0		1	0	1	4

City reports for week ended November 8, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	60	2	0		0	3	2	0
Madison	25	2	0			0	12	
Milwaukee	66	20	3	1	1	2	22	8
Racine	33	3	1		0	0	1	0
Superior	1	1	0		0	0	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	18	0	0		0	0	0	1
Minneapolis	56	34	8		0	3	14	7
St. Paul	51	13	2		0	0	1	9
Iowa:								
Davenport	9	1	1			0	0	
Des Moines	0	3	2			0	0	
Sioux City	9	3	2			0	1	
Waterloo		0						
Missouri:								
Kansas City	27	11	8		1	2	5	7
St. Joseph	1	2	0		0	0	0	0
St. Louis	12	45	9	1		138	2	
North Dakota:								
Fargo	19	0	0		0	0	9	0
Grand Forks	1	0	0			0	0	
South Dakota:								
Aberdeen	0	0	0			0	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	5	13	9		0	0	0	3
Kansas:								
Topeka	2	2	0		0	0	0	0
Wichita	0	4	1		0	0	0	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	3	0		0	0	2	1
Maryland:								
Baltimore	20	28	9	6	1	3	0	25
Cumberland	0	1	0		0	0	0	1
Frederick	0	1	1		0	0	0	0
District of Columbia:								
Washington	3	20	6	1	1	3	0	22
Virginia:								
Lynchburg	1	5	2		0	0	0	3
Norfolk	2	5	6		0	0	1	2
Richmond	3	19	6		2	13	0	6
Roanoke	2	6	4		0	0	0	2
West Virginia:								
Charleston	2	3	4		0	0	5	2
Wheeling	7	2	0		0	0	0	0
North Carolina:								
Raleigh	2	3	2		0	0	0	1
Wilmington	0	1	0		0	0	0	3
Winston-Salem	9	5	1		0	0	1	1
South Carolina:								
Charleston	0	2	1	23	0	0	0	1
Columbia	6	1	2		0	0	2	1
Greenville	0	2	2		0	0	0	0
Georgia:								
Atlanta	1	9	0	12	1	5	0	3
Brunswick	0	0	0		0	0	0	0
Savannah	0	2	0	5	0	0	0	2
Florida:								
Miami	0	2	0		0	0	0	3
St. Petersburg		0			0			1
Tampa	0	2	5		0	0	0	2

City reports for week ended November 8, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	3	0		0	0	0	1
Tennessee:								
Memphis	39	9	16		2	0	4	8
Nashville	0	4	5		0	6	0	6
Alabama:								
Birmingham	1	8	6	10	2	8	0	6
Mobile	0	2	5		0	0	0	0
Montgomery	0	3	4			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	3	1			0	0	
Little Rock	0	3	0		0	0	1	1
Louisiana:								
New Orleans	0	14	17	6	3	0	0	16
Shreveport	0	2	3		0	0	0	2
Oklahoma:								
Muskogee	0	4	2		0	0	0	0
Oklahoma City	0	6	7	4	0	0	0	7
Tulsa	0	6	7			0	0	
Texas:								
Dallas	0	19	22		0	0	1	7
Fort Worth	11	8	5		0	0	1	6
Galveston	0	1	0		0	0	0	1
Houston	0	8	11		1	0	0	3
San Antonio	0	5	3		0	0	3	1
MOUNTAIN								
Montana:								
Billings	2	0	0		0	0	0	0
Great Falls	10	0	0		0	0	0	2
Helena	1	0	0		0	0	0	0
Missoula	15	0	0	1	1	0	0	0
Idaho:								
Boise	5	0	2		0	0	0	1
Colorado:								
Denver	39	14	11		0	3	5	11
Pueblo	3	1	0		0	22	0	0
New Mexico:								
Albuquerque	0	0	0		0	0	0	0
Arizona:								
Phoenix	1	0	0		0	0	0	3
Utah:								
Salt Lake City	11	4	1		0	1	1	7
Nevada:								
Reno	0	0	0		0	0	0	1
PACIFIC								
Washington:								
Seattle	14	5	7			0	13	
Spokane	26	3	1			0	0	
Tacoma	4	4	9		0	0	0	0
Oregon:								
Portland	35	12	2		0	2	9	3
Salem	0	0	0	1	0	0	0	0
California:								
Los Angeles	21	43	23	23	3	9	14	8
Sacramento	3	3	1		0	0	10	6
San Francisco	8	15	5	2	0	3	1	3

City reports for week ended November 8, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	2	7	0	0	0	0	1	1	0	3	24
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	9
Nashua	0	0	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	1	2
Burlington	1	0	0	0	0	0	0	0	0	0	8
Massachusetts:											
Boston	49	29	0	0	0	10	2	0	0	12	221
Fall River	2	5	0	0	0	1	0	0	0	3	22
Springfield	5	3	0	0	0	0	0	0	0	8	37
Worcester	9	20	0	0	0	4	0	0	0	0	38
Rhode Island:											
Pawtucket	1	3	0	0	0	0	0	0	0	0	17
Providence	8	9	0	0	0	1	0	0	0	9	68
Connecticut:											
Bridgeport	7	6	0	0	0	0	0	0	0	0	31
Hartford	4	--------	0	--------	--------	--------	0	--------	--------	--------	--------
New Haven	4	3	0	0	0	0	0	1	0	6	41
MIDDLE ATLANTIC											
New York:											
Buffalo	20	20	0	0	0	10	0	0	0	7	114
New York	88	69	0	0	0	72	17	5	2	80	1,354
Rochester	6	21	0	0	0	2	1	0	0	7	88
Syracuse	6	6	0	0	0	2	0	0	0	2	60
New Jersey:											
Camden	5	2	0	0	0	2	0	0	0	0	34
Newark	11	5	0	0	0	7	0	0	0	13	94
Trenton	1	5	0	0	0	3	1	1	0	1	40
Pennsylvania:											
Philadelphia	60	110	0	0	0	36	5	2	1	11	454
Pittsburgh	34	54	0	0	0	11	1	2	1	1	199
Reading	2	1	0	0	0	1	0	0	0	0	25
Scranton	2	0	0	0	--------	--------	0	0	--------	0	--------
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	13	22	1	0	0	7	1	5	1	0	138
Cleveland	26	46	0	0	0	13	1	0	0	17	198
Columbus	9	15	0	0	0	8	0	1	0	0	88
Toledo	10	12	0	1	0	6	1	0	0	0	71
Indiana:											
Fort Wayne	2	0	0	0	0	1	1	0	0	0	36
Indianapolis	12	21	1	6	0	6	1	0	0	7	--------
South Bend	5	3	0	0	0	3	0	3	0	1	24
Terre Haute	4	3	1	0	0	0	0	0	0	0	20
Illinois:											
Chicago	87	169	0	0	0	28	4	1	0	41	615
Springfield	3	3	0	0	0	0	0	0	0	4	20
Michigan:											
Detroit	72	43	1	0	0	9	2	2	0	42	231
Flint	12	19	1	0	0	2	0	1	0	0	34
Grand Rapids	9	6	1	0	0	0	0	1	0	0	29
Wisconsin:											
Kenosha	1	2	0	0	0	0	0	1	0	3	5
Madison	1	4	0	0	--------	--------	0	0	--------	4	--------
Milwaukee	18	7	0	0	0	2	0	0	0	30	118
Racine	4	6	0	0	0	0	1	0	0	0	8
Superior	3	8	0	0	0	2	0	0	0	6	8
WEST NORTH CENTRAL											
Minnesota:											
Duluth	9	1	0	0	0	0	0	0	0	11	21
Minneapolis	43	11	1	0	0	3	0	0	0	2	105
St. Paul	19	5	1	0	0	1	0	1	0	14	62

City reports for week ended November 8, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—contd.											
Iowa:											
Davenport	0	3	0	3			0	0		0	
Des Moines	10	6	1	5			0	0		0	32
Sioux City	2	5	0	0			0	0		2	
Waterloo	2		0				0				
Missouri:											
Kansas City	13	9	0	0	0	7	0	0	1	7	101
St. Joseph	3	7	0	0	0	1	0	0	0	0	14
St. Louis	33	22	0	0	0	12	3	1	1	4	223
North Dakota:											
Fargo	3	0	0	0	0	0	0	0	0	3	5
Grand Forks	1	0	0	0			0	0		0	
South Dakota:											
Aberdeen	0	2	0	0			0	0		0	
Sioux Falls	3	0	0	0			0	0		0	5
Nebraska:											
Omaha	5	2	1	3	0	2	0	0	0	3	60
Kansas:											
Topeka	4	0	1	0	0	0	0	0	0	3	5
Wichita	5	9	0	0	0	1	0	0	0	0	35
SOUTH ATLANTIC											
Delaware:											
Wilmington	3	2	0	0	0	1	0	0	0	0	22
Maryland:											
Baltimore	16	16	0	0	0	17	3	1	2	11	245
Cumberland	0	0	0	0	0	0	0	4	0	0	10
Frederick	0	0	0	0	0	0	0	0	0	0	3
District of Col.:											
Washington	17	20	0	0	0	14	0	3	0	1	152
Virginia:											
Lynchburg	1	0	0	0	0	2	1	0	0	3	17
Norfolk	3	4	0	0	0	2	0	0	0	0	
Richmond	9	11	0	0	0	1	0	0	0	0	56
Roanoke	4	2	0	0	0	0	0	0	0	0	16
West Virginia:											
Charleston	2	3	0	0	0	1	0	3	0	2	17
Wheeling	2	1	0	0	0	0	0	0	0	0	15
North Carolina:											
Raleigh	1	0	0	0	0	0	0	0	0	0	13
Wilmington	2	0	1	0	0	1	0	0	0	0	11
Winston-Salem	5	2	0	0	0	1	0	0	0	1	19
South Carolina:											
Charleston	1	3	0	0	0	0	0	0	0	3	17
Columbia	1	1	0	0	0	0	0	1	0	0	14
Greenville	1	1	0	0	0	0	0	0	0	0	
Georgia:											
Atlanta	7	16	0	0	0	2	0	3	2	1	67
Brunswick	0	0	0	0	0	0	0	0	0	0	7
Savannah	1	2	0	0	0	2	0	1	0	0	37
Florida:											
Miami	0	1	0	0	0	1	0	0	0	0	19
St. Petersburg	0		0		0	0	0		0		16
Tampa	1	0	0	0	0	1	0	0	0	0	21
EAST SOUTH CENTRAL											
Kentucky:											
Covington	3	11	0	0	0	1	0	0	0	0	21
Tennessee:											
Memphis	6	9	0	0	0	5	2	0	0	0	77
Nashville	3	5	0	0	0	0	2	2	0	0	37
Alabama:											
Birmingham	5	17	0	0	0	4	1	0	0	0	74
Mobile	1	2	0	0	0	0	0	0	0	0	19
Montgomery	0	5	0	0			0	2		3	

City reports for week ended November 8, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0			1	0		2	
Little Rock	2	3	0	0	0	1	0	0	0	0	
Louisiana:											
New Orleans	7	12	0	0	0	12	2	0	0	8	143
Shreveport	2	0	0	0	0	1	1	1	2	0	30
Oklahoma:											
Muskogee	2	0	0	0	0	0	0	2	0	0	
Oklahoma City	3	6	1	1	0	0	0	0	0	0	31
Tulsa	2	4	0	0			0	0		0	
Texas:											
Dallas	7	7	0	0	0	4	2	2	3	2	69
Fort Worth	2	7	0	1	0	3	0	0	0	0	33
Galveston	0	0	0	0	0	0	0	5	0	0	15
Houston	3	4	0	0	0	1	0	0	0	0	70
San Antonio	2	0	0	2	0	3	0	0	0	0	52
MOUNTAIN											
Montana:											
Billings	0	0	0	1	0	0	0	0	0	8	8
Great Falls	2	3	1	0	0	0	0	0	0	0	8
Helena	0	0	0	0	0	0	0	0	0	3	7
Missoula	1	0	0	0	0	0	0	0	0	10	4
Idaho:											
Boise	0	1	0	0	0	0	0	0	0	0	5
Colorado:											
Denver	10	16	1	0	0	5	1	1	0	10	86
Pueblo	1	0	0	0	0	0	1	1	0	3	8
New Mexico:											
Albuquerque	1	0	0	0	0	4	0	0	0	0	9
Arizona:											
Phoenix	2	0	0	0	0	4	0	0	0	0	11
Utah:											
Salt Lake City	3	12	0	0	0	1	2	0	0	10	34
Nevada:											
Reno	1	0	0	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	8	20	1	0			1	6		5	
Spokane	9	3	2	1			0	0		1	
Tacoma	2	2	2	2	0	0	0	0	0	0	22
Oregon:											
Portland	8	5	3	0	0	1	1	0	0	0	66
Salem	1	0	0	0	0	0	0	0	0	2	
California:											
Los Angeles	25	17	3	0	0	23	1	0	0	17	278
Sacramento	3	0	1	0	0	3	0	0	0	3	33
San Francisco	13	5	0	0	0	7	1	2	0	17	163

City reports for week ended November 8, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagara		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	2	0
New Hampshire:									
Nashua	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	1	0	0	0	0	0	2	7	0
Worcester	0	0	0	0	0	0	0	1	0
MIDDLE ATLANTIC									
New York:									
New York	9	2	4	1	0	0	7	7	2
Rochester	0	0	0	0	0	0	0	1	0
Syracuse	0	0	0	0	0	0	0	1	0
Pennsylvania:									
Philadelphia	1	0	3	0	0	0	1	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	2	0	0	0	0	0	4	1
Cleveland	1	0	0	0	0	1	1	11	0
Columbus	0	0	0	0	0	0	0	3	0
Indiana:									
Fort Wayne	0	0	0	0	0	0	0	2	0
Illinois:									
Chicago	2	1	0	0	0	0	2	12	0
Michigan:									
Detroit	0	0	1	1	0	0	0	1	0
Flint	1	0	0	0	0	0	0	0	0
Grand Rapids	0	0	0	0	0	0	1	2	0
Wisconsin:									
Milwaukee	0	0	0	0	0	0	0	2	1
Racine	1	1	1	1	0	0	0	3	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	1	0	0	0	0	0	0	0
Minneapolis	0	1	0	0	0	0	0	4	0
St. Paul	1	0	0	0	0	0	0	4	0
Iowa:									
Des Moines	0	0	0	0	0	0	0	1	0
Missouri:									
Kansas City	0	1	0	0	0	0	0	2	1
St. Joseph	1	0	0	0	0	0	0	0	0
St. Louis	2	1	0	0	0	0	1	0	0
Kansas:									
Topeka	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	0	0	0	0	0	1	2	0
District of Columbia:									
Washington	1	1	0	0	0	0	0	0	0
West Virginia:									
Charleston	1	1	0	0	0	0	0	0	0
Wheeling	0	0	0	0	0	0	0	1	0
North Carolina:									
Winston-Salem	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	3	0	0	0	0
Georgia:									
Savannah	1	1	0	0	0	0	0	0	0
Florida:									
Tampa	0	0	1	0	0	0	1	0	0

City reports for week ended November 8, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagara		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	0	0	0	0	1	0	0	0
Alabama:									
Birmingham	1	0	0	0	0	0	0	0	0
Mobile	0	0	0	0	0	0	0	1	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	1	1	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Oklahoma:									
Muskogee	1	1	0	0	0	0	0	0	0
Oklahoma City	1	0	0	0	0	0	0	0	0
Texas:									
Dallas	0	0	0	0	2	0	0	0	0
Fort Worth	0	0	0	0	0	2	0	1	0
Galveston	0	0	0	0	0	0	0	3	0
Houston	0	0	0	0	0	1	0	0	0
MOUNTAIN									
Colorado:									
Denver	0	3	0	0	0	0	0	0	0
New Mexico:									
Albuquerque	1	0	0	0	0	1	0	0	0
Phoenix	0	0	0	0	0	0	0	1	1
PACIFIC									
California:									
Los Angeles	0	0	0	0	0	0	0	4	1
Sacramento	0	0	0	0	0	0	0	1	0
San Francisco	0	0	0	0	1	0	0	8	1

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended November 8, 1930, compared with those for a like period ended November 9, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities October 5 to November 8, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929
98 cities	72	112	71	135	[2] 79	134	[3] 93	143	[4] 84	156
New England	53	94	64	128	97	110	[5] 85	114	[6] 79	119
Middle Atlantic	42	75	35	88	36	86	[7] 48	99	35	104
East North Central	100	139	92	155	106	163	131	168	110	195
West North Central	66	123	74	167	65	137	91	160	[8] 75	200
South Atlantic	106	139	92	180	97	139	106	144	79	125
East South Central	108	232	162	171	202	185	331	205	243	219
West South Central	64	255	127	339	[2] 88	396	108	434	213	480
Mountain	43	0	17	70	60	26	34	17	120	61
Pacific	94	60	102	87	118	121	78	111	109	97

MEASLES CASE RATES

	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929
98 cities	22	22	36	30	[2] 37	30	[3] 61	38	[4] 58	44
New England	31	16	44	58	69	29	[5] 125	27	[6] 94	20
Middle Atlantic	16	12	23	17	30	21	[7] 29	33	35	20
East North Central	11	29	14	40	16	47	18	40	16	68
West North Central	76	23	140	31	140	21	288	52	[8] 275	94
South Atlantic	11	9	7	9	13	9	18	15	44	9
East South Central	20	14	7	0	27	21	47	0	94	7
West South Central	0	4	4	4	[2] 4	15	0	0	0	4
Mountain	112	61	189	52	137	26	403	244	223	61
Pacific	24	65	66	72	21	63	28	58	28	113

SCARLET FEVER CASE RATES

	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929
98 cities	97	114	123	138	[2] 123	138	[3] 165	155	[4] 172	191
New England	106	162	148	173	144	162	[5] 195	177	[6] 204	276
Middle Atlantic	54	48	90	69	82	75	[7] 139	89	140	102
East North Central	137	173	179	214	172	192	220	226	234	295
West North Central	91	140	114	173	114	173	159	160	[8] 137	187
South Atlantic	115	139	115	127	148	174	152	139	145	167
East South Central	182	123	148	232	169	109	277	205	331	178
West South Central	37	130	78	103	[2] 73	149	71	149	97	152
Mountain	283	148	232	157	163	235	335	226	275	357
Pacific	87	87	59	113	104	104	54	181	111	176

SMALLPOX CASE RATES

	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929
98 cities	2	7	2	12	[2] 2	10	[3] 3	13	[4] 2	9
New England	0	0	0	0	0	0	[5] 0	0	[6] 0	2
Middle Atlantic	0	1	0	0	0	0	[7] 0	0	0	0
East North Central	2	3	4	7	2	12	1	20	4	15
West North Central	6	13	0	21	0	31	19	42	[8] 6	29
South Atlantic	0	0	0	0	0	0	0	0	0	0
East South Central	0	0	0	0	0	0	0	14	0	0
West South Central	4	4	4	0	[2] 8	0	4	27	7	8
Mountain	0	96	26	122	0	52	9	61	9	17
Pacific	7	34	0	84	21	51	17	29	7	19

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930, and 1929, respectively.
[2] Fort Smith, Ark., not included.
[3] Concord, N. H., and Buffalo, N. Y., not included.
[4] Hartford, Conn., and Waterloo, Iowa., not included.
[5] Concord, N. H., not included.
[6] Hartford, Conn., not included.
[7] Buffalo, N. Y., not included.
[8] Waterloo, Iowa, not included.

Summary of weekly reports from cities, October 5 to November 8, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929
98 cities	21	26	17	17	[2] 18	15	[3] 14	11	[4] 11	9
New England	20	16	9	9	27	16	[5] 4	7	[6] 5	11
Middle Atlantic	14	10	11	8	13	8	[7] 10	8	5	8
East North Central	9	8	7	10	5	7	8	6	9	6
West North Central	9	8	15	25	8	6	13	17	[8] 4	12
South Atlantic	64	26	57	24	37	21	29	13	29	13
East South Central	47	27	47	68	94	48	115	34	27	21
West South Central	52	27	22	15	[2] 27	42	15	19	30	11
Mountain	43	749	34	192	77	200	0	78	17	17
Pacific	19	7	26	19	19	5	21	2	19	7

INFLUENZA DEATH RATES

	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929
91 cities	5	8	5	8	5	9	[3] 9	11	[6] 9	8
New England	4	0	7	2	2	0	[5] 2	2	[6] 2	4
Middle Atlantic	7	8	4	6	7	12	[7] 10	9	13	8
East North Central	3	8	4	9	3	10	6	9	6	8
West North Central	6	3	3	9	9	3	9	6	3	3
South Atlantic	2	11	5	9	4	4	16	19	9	4
East South Central	0	22	0	7	7	22	15	30	29	37
West South Central	11	16	8	16	8	20	23	27	15	12
Mountain	9	26	9	17	9	17	17	26	9	0
Pacific	0	6	9	6	9	3	3	3	9	16

PNEUMONIA DEATH RATES

	Oct. 11, 1930	Oct. 12, 1929	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929
91 cities	73	80	74	97	89	108	[3] 100	105	[6] 104	105
New England	64	74	80	97	91	63	[5] 96	74	[6] 82	119
Middle Atlantic	78	87	74	118	108	144	[7] 112	113	122	115
East North Central	55	65	51	81	53	91	88	101	75	78
West North Central	86	54	53	69	59	72	95	135	86	108
South Atlantic	79	103	88	81	125	112	123	116	139	137
East South Central	140	104	184	112	96	134	74	157	155	90
West South Central	119	113	96	90	134	86	111	105	119	125
Mountain	94	122	189	122	77	122	163	131	189	131
Pacific	49	57	80	82	74	44	40	31	52	72

[2] Fort Smith, Ark., not included.
[3] Concord, N. H., and Buffalo, N. Y., not included.
[4] Hartford, Conn., and Waterloo, Iowa, not included.
[5] Concord, N. H., not included.
[6] Hartford, Conn., not included.
[7] Buffalo, N. Y., not included.
[8] Waterloo, Iowa not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended November 8, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended November 8, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia			1		
New Brunswick					9
Quebec		4			32
Ontario		1	17	9	9
Manitoba			3		7
Saskatchewan					1
Alberta			2		2
British Columbia	1				5
Total	1	5	23	9	65

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended November 8, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended November 8, 1930, as follows:

Disease	Cases	Disease	Cases
Chicken pox	105	Mumps	42
Diphtheria	46	Scarlet fever	109
Erysipelas	5	Tuberculosis	83
German measles	1	Typhoid fever	33
Influenza	4	Whooping cough	80
Measles	80		

CHINA

Manchuria—Plague.—According to information dated October 9, 1930, the epidemic of bubonic plague in northern Manchuria and Mongolia was still in progress. Between July 29 and September 21, 1930, about 67 deaths from the disease were reported in 13 villages near the Kaitung station, on the Ssupingkai-Taonan Railroad. In a Mongolian village, Hain An Li, 10 miles from the Taipingchuan station, plague appeared on August 15, and caused 26 deaths in about three weeks. No further cases had been reported.

In Payintala, near Tungliao City, several deaths from plague were reported to have occurred toward the end of August. On September 1, plague appeared in Suchuantun, a village situated about 20 miles west of the Taonan station, in the Tuchuan district. Eight deaths occurred within 10 days. No further cases had been reported. A case was reported in a village just outside Tungliao City on September 12.

The first locality affected in the vicinity of the Nungan district was Halahaichentzu, in the Kuerlossu principality in Inner Mongolia, on August 24. Several deaths resulted. The infection was spread to Kungchiatun village, in the Nungan district, where some 30 deaths occurred about August 24. From here the epidemic spread toward the northeast, involving several villages. Deaths from plague occurring in this neighborhood were estimated at about 150.

Efforts were being made to prevent the spread of the infection to railway towns, and stringent measures were being taken in the villages to combat the epidemic.

CUBA

Provinces—Communicable diseases—Four weeks ended October 25, 1930.—During the four weeks ended October 25, 1930, cases of certain communicable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		2		3			5
Chicken pox		5		1			6
Diphtheria	2	11	1	2	3	1	20
Malaria	5	16		1	8	24	54
Measles		7			3		10
Paratyphoid fever	2			1		1	4
Scarlet fever		4					4
Tetanus (infantile)	1				1		2
Typhoid fever	5	18	3	30	3	13	72

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930				October, 1930				November, 1930		
							6	13	20	27	4	11	18	25	1	8	15
Afghanistan	C			[1] P	P												
China:																	
Amoy	C							1	1								
	D							1	1								
Canton	C	3	2	2							1			1			
	D			1													
Shanghai	C					8	4		22	23	5	6	4	1			
	D						1	1	1	2			2				
Shensi Province	C								P								
Swatow	C	3	7		3	1	1										
Tientsin	C				2	1											
India	C	56,311	37,102	26,121	42,803	14,249	11,823	13,072	12,407								
	D	44,878	25,711	13,822	22,358	5,879	5,732	6,409	5,939								
Bassein	C	7					1										
	D	5															
Bombay	C				14			1		1	3	1	11	17			
	D				8			2		1	2		8	10			
Calcutta	C	609	327	220	63	8	10		9	4	4	7	9	7			
	D	372	179	128	30	3	3		6	3	4	4	4				
Madras	C				1							2					
	D				1							2					
Negapatam	C		1														
	D		1														
Rangoon	C	9	6	1	1	1	1					1					
	D	3	4	1	1	1						1					
India (French):																	
Chandernagor	C	6	3	1			1				1	2					
	D	6	2								1						
Karikal	C		3														
	D		3														
Pondicherry	C											1					
	D											1					

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15
India (Portuguese)	C				1		1										
Indo-China (see also table below):																	
Pnompenh	C	1	40	32	11					1		1		1			
	D	5	18	22	6												
Saigon and Cholon	C	160	48	10	5					1	1			1			
	D	101	23	3	1												
Philippine Islands:[1]																	
Ports—																	
Cebu	C		1	65	9	1	1										
	D			36	8	1	1										
Iloilo	C			29	64	3	4	1	2	1							
	D			22	56	4	5	2	3	2			2				
Manila	C	1			1	16	13	10	4	2	1	2					
	D					5	6	1			1						
Provinces—																	
Antique	C				20	2	25	12	8	12		28					
	D				12	1	14	12	7	8		10					
Bohol	C				138	30	14	4	1								
	D				79	12	6	2									
Bulacan	C		3	4	1	1	2	1			2						
	D		1			1	1				1						
Capiz	C			3	2	1											
	D			2	2												
Cebu	C	1	355	713	85	1	16	8									
	D	1	170	303	50	1	6	4									
Iloilo	C		2	309	571	71	60	61	46	18	7	13	12	10	10	4	6
	D		1	193	376	45	45	35	26	15	6	7	12	7	7	3	6
La Union	C			1													
Leyte	C		47	11													
	D		19	11													
Masbate	C		10	92	34												
	D		3	35	14												
Misamis, Occidental	C			3													
	D			3													

Negros, Occidental	C	10	140	568	343	40	43	24	15	8	10	5	5	12	3	19	22
	D	7	88	368	237	32	30	20	9	6	5	6	3	12	3	12	14
Negros, Oriental	C			23	8												
	D			13	4												
Nueva Acija	C			1													
	D			1													
Pampanga	C		2	2		1											
Pangasinan	C			3	1												
	D			2	1												
Rizal	C		1	1													
	D		1	1													
Samar	C				18			3	1	4			3	6	3	4	3
	D				16			2		4			3	5	1	4	2
Sorsogon	C															5	
	D															4	
Surigao	C				25	1				(2)							
	D				17	2											
Tarlac	C				1												
Siam	C	33	27	20	3							1	3	3			
	D	21	19	9	2								1	3			
Bangkok	C	9	12	8	1							1	2	1	2		
	D	3	5	3	1							1	1	1	1		
Songkla	C			10													
	D			6													
On vessel:																	
S. S. Malwa from Shanghai	D								1								
S. S. Sassari at Massoua, from Jeddah	C	1															
	D	1															
On small boat at Port Cebu, from Bantayan Island	C		1														
	D		1														

Place		April, 1930	May, 1930	June, 1930	July, 1930			August, 1930			September, 1930			October, 1930	
					1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20
Indo-China (French) (see also table above):															
Annam [3]	C	60	23	16			1		3						
Cambodia [3]	C	24	88	144			43	37	22		23	13	2	16	
Cochin-China [3]	C	48	671	273			46	22	5		9	6	18	14	6

[1] Figures for cholera in the Philippine Islands are subject to correction.
[2] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, Philippine Islands.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15
Algeria:																	
Algiers	C			3	7	1	2	6	2	1	1	2	2	5		1	
	D													3			
Constantine	C		1	1													
Oran	C			3	4	1	2	3	4		4	4	2	1			
	D							1				2	1				
Plague-infected rats				2			10			2			4	1			
Philippeville	C						1			1		1	1	1		1	
Belgian Congo	C			2	2	2	3										
	D			2	2		3										
British East Africa (see also table below): Uganda	C	227	406	228	236	44	40	57	61								
	D	195	328	213	229	37	39	55	60								
Canary Islands: Las Palmas	D				1												
Ceylon:																	
Colombo	C	6	1	3	2	2				1	1		1				
	D	5	1	3	2	3				1	1		1				
Plague-infected rats			1	1													
China:																	
Manchuria—Tungliau and Nungan	C				30			29	P	2							
Shensi	C								P					P			
Dutch East Indies:																	
Batavia and West Java	C	82	98	84	83	13	14	26	26	22	14						
	D	82	98	84	83	12	14	26	24	22	14						
Plague-infected rats		5	4		1		1	1	1								
Java and Madura	D	185	202	217	188	55	54	67	84	75	68						
Ecuador (see table below).																	
Egypt:																	
Alexandria	C	13	19	23	11	3	3	2	2	2	1	3	3	2	1	1	3
	D	3	9	10	6	5	1	2		3	1	1	1	3		2	2
Assiout	C	20	9	2												3	
	D	5	3	2												1	
Beni-Suef	C				1												
Dakahlieh	C	11	1														
	D	2															

Gharbieh	C				3												
	D				1												
Girga	C			1		1											
Minieh	C	7	10	3													
	D	1	1														
Port Said	C	2	2	1	1									1			
France:																	
Marseille	C					2	2	1					4	2	1		
St. Ouen	C			1													
	D			1													
Gambia	C				4												
	D				4												
Greece (see also table below):																	
Patras	C		1	1													
Pyrgos	C										2						
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats			1														
India	C	648	240	377	877	593	600	704	600								
	D	635	187	256	477	262	291	328	251								
Bassein	C					1		1							1		
	D					1		2									
Bombay	C	6	3	1			1			1			1	1			
	D	5	2	1			1				1		1				
Plague-infected rats		81	26	52	35	12	9	11	15	21	13	16	14	2			
Madras Presidency	C	38	39	47	81		47	41	39			7					
	D	11	22	31	34		23	13	21			9					
Rangoon	C	4	1	2	3	2	1	5	2	2					1		
	D	3	1	2	2	2	1	4	2	2					1		
Plague-infected rats		5	1	6	7	2		2	4		1			1			
India (Portuguese)	D	7			P												
Indo-China (see also table below):																	
Pnompenh	C	3	6	2	4	2	1			1	1						
	D	1	7	2						1	1	1		1			
Saigon and Cholon	C	1	2		1		1			1							
	D		1														
Iraq: Baghdad	C	37	28	18	9					1							
	D	18	15	7	3					1							
Kwang-Chow-Wan	C	34	31	4	1												
Madagascar (see also table below): Tamatave	C		1	1	2		1	P			1			3			
	D										1			3			
Morocco	C	71	3	1	15									4		P	
	D	34	4		2												
Nigeria: Lagos	C	2	5	1	7	1	1	3	1		3		2				
	D	2	5	1	7	1	1	3	1		3		2				
Plague-infected rats		17	11	18	8		4	2	4								
Senegal (see table below).																	
Siam	C	5			7	3								3	1		
	D	4			6	2								3	1		
Bangkok	C	5			3												
	D	4			2												
Nagara Rajsima	C				2		1										
	D				2		1										
Syria: Beirut	C		12	9	2	3	2							1		3	1
Tripolitania	C				2												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15
Tunisia:																	
Sfax district	C	21	9	6	1												
Tunis	C	1	1	5													
	D		1	1													
Union of Socialist Soviet Republics:																	
Salsk Region	C		2	5	7												
	D		1	4	5												
Stavropol Region	C		1														
	D		1														
Union of South Africa:																	
Cape Province	C	P	1	1	1				1								
	D			1	1			1									
Orange Free State	C					1		1									
	D					1		1									

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	107	97	87	53	7
Ecuador: Guayaquil	C	0	0				
	D	0	0				
Plague-infected rats		0	0				
Greece (see also table above)	C		1				
Indo-China (see also table above)	C		11	1	2	4	
Madagascar (see also table above):							
Ambositra Province	C	1					
	D	1					
Antisirabe Province	C	19	3	24			
	D	19	3	24			
Miarinarivo Province	C	5	1	1			
	D	5	1	1			
Moramanga Province	C	1	3		2		
	D		3		2		
Madagascar (see also table above)—Con.							
Tananarive Province	C	15	16	28			
	D	14	16	28			
Senegal:							
Baol [1]	C	13	2	62	79	48	53
	D	11	2	48	20	23	35
Dakar [1]	C	52	53	140	108	3	
	D	42	117	122	90	8	
Louga [1]	C	54	60	138	75	61	37
	D	27	21	103	33	30	21
Thies [1]	C	21	52	54	34	12	16
	D	8	35	30	20	4	10
Tivaouane [1]	C	135	43	119	110	20	43
	D	69	28	70	54	14	25

[1] Incomplete reports.

SMALLPOX

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15
Algeria:																	
Algiers	C	3		1	3												
Constantine	C		1	1												1	
Arabia: Aden	C			1													
Bolivia: La Paz.[1]																	
British East Africa (see also table below):																	
Tanganyika	C	409	1, 610	168	242	198	288		36	27		4					
	D	70	301	42	37	4	55		1	1		1					
British South Africa:																	
Northern Rhodesia	C	59															
	D	9															
Southern Rhodesia	C	155	79	31	1	1				14	39						
	D	13															
Canada:																	
Alberta	C			5	1				1		13	8	1				
British Columbia—Vancouver	C	4	2	6	6			1	1	1			1		3		
Manitoba	C	10	4			1											
Ontario	C	82	47	24	20	2	2	6		1		3	15		20	9	
North Bay	C	1															
Ottawa	C	25	15	13	7	2	1	2						14		9	14
Toronto	C	4	4	1				1									
Quebec	C		4	3	5												
Montreal	C				7												
Saskatchewan	C	39	22	5	8			1			3				2		
Regina	C	4															
China:																	
Changking	C	P	1	P	P	P	P	P	P	P	P	P					
Foochow	C	P	P	P	P		P		P		P						
Hong Kong	C	12	4	2													
	D	9	3	1													
Manchuria—																	
Harbin	C	20	4	3	2												
Kwantung—Dairen	C	8	16	8													
	D	4	1														
Nanking	C	P	P	P	P	P	P	P	P	P	P	P					
Shanghai—																	
Foreigners only	C	2	5	4	3			18					1	1			
Including natives	D	5	3					2									
Swatow	D	6	4	1	4	1	1			1			3	1			
Tientsin	C	1								1							

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15
Chosen (see table below).																	
Colombia:																	
Barranquilla	C				2												
Buenaventura	C	4	6	10	2												
Cali	D										1		1				
Costa Rica:																	
Port Limon	C	2	2														
San Jose [2]	C	2															
Curacao (alastrim)	C	2	1	2	1												
Dutch East Indies:																	
Borneo	C	16	12	2													
	D	1	1														
Java—																	
Batavia and West Java	C	12	13	8	12	2	5	2	2	10	2	1					
	D	7	3	5	5	2		1	1	1	1	1					
East Java and Madura	C			1													
Saggi Islands	C	26		11	36	14											
	D	5		3	2	3											
Egypt: Port Said	C	1		3													
France (see table below).																	
Great Britain:																	
England and Wales	C	1,417	926	529	344	99	106	75	61	82	74	44	125	86	87		
Ashton under Lyne	C	17	7	8													
Bradford	C	2		1							1	1	1				
Cardiff	C			2										1			
Leeds	C			1										1			
London	C	637	498	250	178	43	44	36	41	30	34	23	33	29	32		
London and Great Towns	C	1,078	753	408	285	79	84	51	54	55	56	32	80	52	58		
Stoke-on-Trent	C	62	32	9	2			1	1			1			1		
Scotland	C		4	1			5										
	D			1													
Honduras: Naco	C							5									
India	C	22,835	12,962	7,630	4,877	830	940	610	751								
	D	5,451	3,531	2,348	1,246	202	209	119	150								
Bombay	C	218	113	50	12	2	1	1	2								
	D	161	79	33	10	2	1	2									

Calcutta	C	302	161	73	25	4	5	3	2	3	4	3	2	2			
	D	258	146	56	21	3	4	1	1	3	4	3	1	2			
Cochin	C	37	16	6	14	1	1		1			8	4	3			
	D	8	4			1						1		1			
Karachi	C	14	7	1	4			1	3								
	D	4	3		3				2								
Madras	C	72	35	49	38	9	11	6	8	4	4	8	3	2			
	D	15	10	12	11	1	1	1	3	1	2	3	2				
Moulmein	C	89	21	18	2	1											
	D	21	7	1	1			1									
Negapatam	C	1	2	4	4	1	2		6	4	2	5	3	2			
Rangoon	C	6	9		3								2				
	D	1	2														
Tuticorin	C	5	1										1				
Vizagapatam	C	5	1									1					
India (French):																	
Chandernagor	C	24	19	4				1	2			3					
	D	7	3	3			1	1				1					
Karikal	C	12	11	2	9		5			1							
	D	3	8	2	9		2			1							
Pondicherry Province	C	40	23	26	22	11	7	7	10	11	10	6		1			
	D	36	23	25	22	11	7	7	8	11	8	6		1			
India (Portuguese)	C	47	28	1	9	1	2		1								
	D	8	10	1	2												
Indo-China (see also table below):																	
Pnompenh	C	3		1								2					
	D		1	1	1												
Saigon and Cholon	C	3	1		1	1									2		
	D	2			3	1									2		
Iraq:																	
Baghdad	C	1	1	3	1				1		2						
	D	1		1	1												
Mossoul Liwa	C	21	4	67						63		4	2			6	
	D	3	1	20						27							
Jamaica (alastrim)	C	2															
Macao	D	1															
Mexico (see also table below):																	
Jalisco (State) Guadalajara	D	7	15	4	1						2		1	1		1	
Juarez	C		6		2			1		1				1			
	D		1		1												
Mexico City and surrounding territory	C	80	77	37	10	7	2	1	2	1	3	5	4				
	D	32	17	8	6	1	1	1	2			1	2				
Progreso	C	1															
	D	1	1														
Morocco (see table below).																	
Nigeria: Lagos	C		1														
Poland	C	3	2														
Portugal:																	
Lisbon	C	8	10	13	50	7	8		12	4	5		7	12			
Oporto	C				1												

[1] 5 cases of smallpox were reported Apr. 14, 1930, in Costa Rica, outside of city of San Jose.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15
Siam	C	2		6							1						
	D			3													
Somaliland, British: Boales	C										1						
	D										1						
Spain	C		12	5	2		4	1									
Straits Settlements	C	11	9	11	8	1	2	2	1	1	1	1	2	3	3		
	D	3	2	3	3		1					1			1		
Sudan (Anglo-Egyptian)	C	19	67	12	42	102	5	20	1	25	1	56		3			2
	D	2	3	1	3	50	2			2		5					1
Sudan (French) (see table below).																	
Switzerland: Berne Canton	C			1	2					1							
Syria (see table below).																	
Taiwan: Taihoku (see table below).																	
Tunisia: Tunis	C	2	2	1					2								
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P		P			P	P	P								
Orange Free State	C			P	P												
Transvaal	C				P	P	P	P	P	P							
Upper Volta	C	1	13														
On vessel:																	
S. S. Naldera, at Port Said	C	1															
S. S. Manoa, from Honolulu to San Francisco	C			1													

Place		April, 1930	May, 1930	June, 1930	July, 1930: 1-10	11-20	21-31	August, 1930: 1-10	11-20	21-31	September, 1930: 1-10	11-20	21-30	October, 1930: 1-10	11-20
Indo-China (see also table above)	C	261	305	213			238	59	34		54	52	86	32	62
Sudan (French)	C	521	274	76		34				39		P			17
	D	36	32	18						3					2
Syria: Beirut	C	19	7	7			2	1							
Taiwan: Taihoku	C	12													

Place		April, 1930	May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930
British East Africa (see also table above):							
Kenya	C	174	171	142	186		
Uganda	C		78				
	D		69				
Chosen	C	253	107		3	2	
	D	53	35				
Seishin	C	5	2	1	2		
	D	1	1				

Place		April, 1930	May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930
France	C	58	51				
Mexico: Durango (see also table above)	D	4	4	3	3	3	2
Morocco	C	10	18	5	3	8	1
Turkey	C	3	16				

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	Nov. 1, 1930
Algeria:																				
Algiers	C	8	15	3	6				2		3								
Constantine Department	C	15	6	12	2				3						2			1	
Oran	C		3	4	3		1			1						1	2		
Bolivia: La Paz.[1]																			
Brazil: Porto Alegre	C		1																
Bulgaria	C	15	6	16	10		1				2	2		2		1			
	D	1	2	1	1														
China:																			
Manchuria—Harbin (see also table below)	C	52	13	8	2	2				2									
Shanghai	C						1												
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C	1		1	1			1			1	1	1	1					
Beheira Province	C	2	49	45	15								1						
	D		13	4	2														
Cairo	C					2			5			1							
Port Said	C								4		1				1			1	

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 6–May 3, 1930	May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	Week ended— August, 1930					September, 1930				October, 1930				Nov. 1, 1930
						2	9	16	23	30	6	13	20	27	4	11	18	25	
Great Britain: Scotland—																			
Dunfermline	C				1														
Glasgow	C		1																
	D		1																
Greece (see table below).																			
Ireland:																			
Irish Free State—																			
Galway County—Oughterard	C				2														
Kerry County—Dingle	C	5																	
Leitrim County—Mohill	C			9	1														
Mayo County—																			
Ballina	C		2	1	1														
Castlebar	C								1										
Swinford	C		14																
Westport	C				2	1													
Roscommon County—																			
Roscommon	C				1														
Strokestown	C				1														
Wicklow County—Shillelagh	C			4	2														
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico:																			
Durango	D												1	1		1			
Mexico City, including municipalities in Federal District	C	4	6	9	5	2	2	2	3	2	2	3				3	5		
	D	4	3	1		1	1				1	1				2			
Morocco	C	15	11	15	11				8		2							1	
	D	3															1		
Palestine	C	1	2	2	6		1	1	1		1	1	1		1	1	1		
Poland	C	243	171	117	36	10	15	2	7	2	3	6	12	3	6	6	7	7	
	D	15	5	11	4	1		1	1		1			1			1		
Portugal:																			
Lisbon	C	4																	
Oporto	C	1						1							1	1	1		2

Rumania	C	186	227	58	28	5		2	2	1		1	2	3					
	D	11	35	5	8	2													
Spain: Valencia	C			3	3							1					1		
	D				1							1					1		
Tunisia	C		6	18	24	2	5		3	1	1		4	1	1	1	9		
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
Municipality of East London	C				1								2			1			
Natal	C	P	P	P	1	P	P	P				P			P				
Orange Free State	C		P	P	P	P	P	P	P	P	P	P	P						
Transvaal	C	P			P	P	P	P		P	P	P	P	P					
Yugoslavia (see table below).																			

Place		Apr., 1930	May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930
China: Harbin (see also table above)	C	204	240		14	5	
Chosen: Seoul	C	3	43	2	3	2	1
Czechoslovakia	C	29	12	1		1	
Greece: Athens	C	1	3	3	6	6	
Latvia	C		3	3	3	1	
Lithuania	C	73	27	16	18	7	24
	D	4				1	2
Turkey	C	3	16	2		2	
Yugoslavia	C	22	16	6			
	D	4	1				

YELLOW FEVER

	Cases
Brazil:	
Mage, on the Leopoldina Ry., between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

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SPECIAL ARTICLES

Venereal Disease Among Coast Guard Enlisted Personnel

A Report on Miliary Lung Disease due to Unknown Cause

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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VENEREAL DISEASE AMONG COAST GUARD ENLISTED PERSONNEL DURING THE FISCAL YEAR 1929 [1]

By W. W. KING, *Medical Officer, United States Coast Guard Headquarters; Medical Director, United States Public Health Service*

A record of the cases of venereal diseases reported among Coast Guard enlisted personnel has been kept for the third successive year, and this report is submitted primarily for the information of officers of the Public Health Service who treat the cases and of the Coast Guard under whom the patients serve.

The study of these conditions is the result of a conference of officers of the Public Health Service and of the Coast Guard whose purpose was to determine what further action could be taken to reduce the incidence of venereal diseases among Coast Guard personnel. In the discussion of the problem it soon became evident that, while these diseases were prevalent, there was not even approximately accurate knowledge of the actual conditions. Such preventive and remedial measures as were then in effect were based on general impressions and there were no data by which the success or failure of those measures could be judged. The recording of cases and the tabulation of data were undertaken to ascertain existing conditions and to know what changes take place in them.

It must not be understood that this was the first time that this problem had been considered or that measures had been taken for its solution, but it was the first time that it had been put on the basis of knowledge of the conditions and results. At the time of the conference mentioned, the chief measure in effect was the provision of prophylactic packets to units which included them in their medical requisitions. Most of the larger units carried them in stock, but their use was limited. Provision for the use of other prophylactic ointments and injections were available in some units for those who cared to apply for such treatment. In various ways, men were advised of the dangers of venereal disease. It has been impossible to ascertain how extensively these measures were being carried out. Some medical officers and some Coast Guard officers were interested and made more or less of an effort to do so, but it is the impression that there was a general feeling that venereal disease was an inevitable evil against which little could be done, and therefore the interest was not keen.

[1] Published by permission of the Commandant, U. S. Coast Guard.

At a second conference in 1928, steps were planned to extend a movement already started by Surg. W. C. Rucker, of the United States Public Health Service, at the Marine Hospital, New Orleans, La. Surgeon Rucker had found that talks on subjects of health and prevention of sickness, given in simple language, had been received with great interest by the patients in that hospital. It was believed that all beneficiaries of the Public Health Service would be equally interested, and that much good could be done by such talks.

The extension of this movement was authorized and put in charge of Surg. C. E. Waller. Health talks were to be instituted wherever a sufficient number of beneficiaries of the Public Health Service were grouped, and the larger units of the Coast Guard were therefore included wherever practicable. In the wide range of subjects dealing with health, hygiene, and the prevention of sickness, venereal diseases would naturally occupy a prominent place. There have been much inertia and other difficulties to meet in organizing and instituting these talks, but the work has been done; and venereal diseases and their prevention have been the subject of a number of such talks to Coast Guard men, illustrated at times by moving pictures and lantern slides. Reports indicate that, in general, considerable interest has been shown and that this measure is capable of important development.

It was felt that, in the meantime, the measures already in effect could be carried on more vigorously and more effectively. Efforts have been made to encourage the use of the prophylactic packets and also to put before the men better knowledge of the venereal diseases, their dangers, and reasons for their prevention or avoidance. This has been done by the personal efforts of medical officers and Coast Guard officers, and by the posting of bulletins, by articles in service papers, and by the distribution of literature.

In 1927 the Public Health Service published, for distribution to its beneficiaries, a pamphlet written by Senior Surg. C. H. Lavinder, entitled, "Where Away," setting forth in clear language the essential facts about venereal diseases and their prevention and care. A sufficient number of copies was sent to each Coast Guard unit to supply one copy to each man. A supply is kept at the medical section, Coast Guard headquarters, and additional copies are furnished from time to time upon request. Information is very meager as to the reception given this pamphlet, but there is reason to believe that, in general, it was found to be of interest and value.

It is quite evident that considerable interest has been aroused in this subject, and that in itself is a most valuable step toward the object desired, which is to reduce the incidence of these diseases to the lowest possible point. There is no easy way to accomplish this; and when this point is reached, it can be maintained only by continued interest and unremitting effort.

It is impossible to determine just how much effect may be attributed to each measure employed. Much of the time we may be stumbling more or less blindly, but the value of these efforts as a whole may be judged by the effect as a whole. It does not seem illogical to attribute in large part the improvement in the conditions relative to venereal diseases in the Coast Guard to the measures used to combat them. Undoubtedly other factors have had their effect for and against, but they are very difficult to determine qualitatively and quantitatively.

Record was made of every case reported as gonorrhea, chancroid, or syphilis during the fiscal year. The diagnosis is made by the medical officer treating the case and is not questioned, although effort is made to clear up doubtful and inconsistent reports and to correct errors. There is no means of estimating the number of unreported cases. Opinions as to their number differ; but it is believed that they are not numerous.

In the tables the term "late syphilis" is used, by which is meant any form of syphilis other than primary. The distinction between "primary" and "late" is desirable in the consideration of prevention, because the problems presented by each are different. At first, separate classification of "secondary" and "tertiary" was attempted, but was abandoned when found impracticable, as an identical case often would be reported under each diagnosis, and the distinction in diagnosis would serve little purpose in the problems of prevention. The diagnosis of syphilis was not infrequently qualified as "latent," apparently when no active symptoms were present. In a number of cases, the only evidence of syphilis seemed to be a positive Wassermann found upon physical examination for reenlistment or during hospitalization for another disease. Some of these cases were not reported as treated, but it is probable that most of them were treated then or later.

Comparison of the number of cases and of the rate per 1,000 is made in Tables 1 and 2, including cases continuing from the previous years. When a man was reported as having more than one venereal disease during the year, the case was counted under the head of each disease, hence the number of men affected is somewhat less than the total number of cases. Tables 3 and 4 show the number of cases of mixed and multiple infections.

TABLE 1.—*Number of cases reported*

	1927	1928	1929
Gonorrhea	764	677	645
Chancroid	86	116	65
Primary syphilis	65	54	50
Late syphilis	115	110	118
Total	1,030	957	878

Table 1 shows that there was a reduction of 79 in the actual number of venereal cases reported during 1929, as against a reduction of 73 in the preceding year. In this connection, consideration must be given to the fact that the total number of enlisted personnel has increased each year. The average number of enlisted personnel for 1927, 1928, and 1929, was 9,750, 10,378, and 10,692, respectively, and had the 1928 rate prevailed during 1929 there would have occurred 986 cases instead of 878, or a practical reduction of 108 cases. Between 1927 and 1928 a similar reduction of 139 cases occurred, i. e., had the 1927 rate prevailed in 1928, there would have been 1,096 cases instead of 957.

Taking each year as a unit, Table 1 shows every case of venereal disease, new and old, reported during the year, and thus represents the actual situation, according to all obtainable information, which the Coast Guard and Public Health Service are called upon to meet. Any decrease in the course of a year, irrespective of cause, is an improvement, an increase the reverse.

TABLE 2.—*Rate per 1,000, all cases*

	1927	1928	1929
Gonorrhea	78.36	65.23	60.33
Chancroid	8.82	11.17	6.08
Primary syphilis	6.66	5.20	4.68
Late syphilis	11.80	10.60	11.03
All cases	105.64	92.21	82.12

The rate of occurrence of reported cases, as shown in Table 2, was approximately 82 per 1,000 men of the average enlisted personnel in 1929, as against 92 and 106 for 1928 and 1927, respectively. These rates show clearly the relative improvement in venereal diseases. What relation the rates for venereal diseases bear to the general sick rate or to the rates for other diseases can not be determined because there are no data available from which these rates can be calculated.

The number of new cases in 1929 (Table 3) shows a decrease, with the exception of late syphilis, which increased slightly. This is not surprising, in view of present-day diagnostic facilities by which latent cases are discovered and others of obscure manifestations are found to be syphilitic.

TABLE 3.—*New cases reported*

	1927	1928	1929
Gonorrhea	719	590	565
Chancroid	86	111	60
Primary syphilis	60	50	48
Late syphilis	98	78	86
Total	963	829	759

The marked decrease in the number of cases of chancroid calls for some comment. Comparison of the number occurring in each of the three years shows a marked difference each year; there were in all 86 cases reported in 1927; 111 in 1928; and 60 in 1929. It is evident that data covering several more years must be at hand to determine whether the number for 1928 was exceptionally high and that for 1929 exceptionally low, or whether the incidence of the disease normally fluctuates within a wide range.

TABLE 4.—*Rate per 1,000, new cases*

	1927	1928	1929
Gonorrhea	73.71	56.85	52.84
Chancroid	8.82	10.70	5.61
Primary syphilis	6.15	4.82	4.49
Late syphilis	10.05	7.52	8.04
All new cases	98.77	79.88	70.98

New cases are those reported for the first time during the period of the year. They do not include any case already reported either in the same or previous year. A case of primary syphilis is carried as primary syphilis to the end of the year, although it may pass into the later stage and be treated as secondary syphilis before the end of the year. If the same patient is put under treatment during the following year for secondary syphilis, it is not counted as a new case because it was counted as a new case when in its primary stage.

Table 4 shows the relative changes in the rate of occurrence of new cases; i. e., those which originated, with certain exceptions, while the patient was in the Coast Guard. It is precisely this class of cases which it is especially desired to prevent, and the rates given in this table would therefore be the best criterion by which to judge the results of the preventive measures. The exceptions mentioned are the few cases (noted in Table 15) contracted prior to enlistment and an unknown number of cases of late syphilis contracted prior to enlistment, sometimes years before. It is also true that some cases reported for the first time as late syphilis were contracted after enlistment and were not reported during the primary stage.

The number of cases diagnosed simply as urethritis and ulcer in 1929 was approximately double that for the preceding year; 50 and 13 as against 24 and 7, respectively. Of the urethritis cases, 11 were treated in hospital, and 2 were off duty but not in hospital. Outpatient treatment covered a total period of 530 days, hospital treatment 125 days, and off duty but not in hospital 34 days. Three cases of ulcer were in hospital 75 days and three other cases were in hospital for a concurrent venereal disease. The other 7 patients received 142 days outpatient treatment.

These cases are not included in the data given for venereal disease but require mention because an unknown proportion were undoubtedly undiagnosed cases of gonorrhea, chancroid, or syphilis, and the increase in this class of cases may account for some of the decrease in the number of definitely diagnosed venereal cases. However, even granting that a greater number of cases of gonorrhea, chancroid, and syphilis have fallen into this undefined class in 1929, the number would not be sufficient to account for all the decrease shown in the number of those diseases.

Cases of more than one venereal disease in the same patient may be divided into two classes—those called "mixed infections," in which the patients were under treatment for more than one venereal disease at the same time, and those which may be designated by the term "reinfections," in which the patients were under treatment at different times (Tables 5 and 6).

TABLE 5.—*Mixed infections*

Treated at the same time for—	1927	1928	1929
Gonorrhea and primary syphilis	5	5	4
Gonorrhea and late syphilis	15	21	10
Gonorrhea and chancroid	10	10	3
Gonorrhea, chancroid, and primary syphilis	0	4	1
Gonorrhea, chancroid, and late syphilis	2	0	2
Chancroid and primary syphilis	2	9	2
Chancroid and late syphilis	3	3	8
Total	37	52	30

TABLE 6.—*Reinfections*

Treated at different times for—	1927	1928	1929
Gonorrhea and primary syphilis	3	0	4
Gonorrhea and late syphilis	1	0	3
Gonorrhea and gonorrhea (apparent reinfection)	0	1	5
Gonorrhea and chancroid	3	7	5
Gonorrhea at one time, chancroid and primary syphilis at another time	0	0	1
Gonorrhea at one time, chancroid and late syphilis at another time	1	0	0
Chancroid and chancroid (apparent reinfection)	0	3	0
Chancroid and primary syphilis	0	1	1
Chancroid and late syphilis	1	4	0
Total	9	16	19

As the cases recorded in Tables 5 and 6 were tabulated in the other tables under the heading of each disease and sometimes twice under the same disease, it follows that the number of men affected is less than the number of cases by the number of duplications in tabulation. The number of men affected, after proper deductions, is shown in Table 7.

TABLE 7.—*Number of men affected*

	1927	1928	1929
Men affected	986	884	824
Percentage of average enlisted personnel	10.1	8.5	7.7

A man is not discharged from the Coast Guard because of physical disability due to venereal disease when there is hope of his restoration to duty within a reasonable time and without his being a menace to his shipmates. The number of men discharged in 1927, 1928, and 1929 for physical disability due to venereal disease is shown in Table 8.

TABLE 8.—*Discharges for physical disability due to venereal diseases*

	1927	1928	1929
Gonorrhea	302	39	57
Chancroid	18	1	1
Primary syphilis	27	4	1
Late syphilis	39	15	8
Total	386	59	67

The very great reduction from 1927 to 1928 in the number of men discharged for this cause was the result of a change in policy early in March, 1928. The increase in the number for 1929 over that for 1928 may have been influenced somewhat by the fact that a smaller number of men suffering with venereal disease were discharged on account of undesirability, inaptitude, and other reasons in 1929 than in 1928. There were 41 such discharges in 1928 and 16 in 1929.

The days in hospital have been charged to one disease only, although at times a patient had more than one disease requiring hospital treatment. Hospital days are not included in the case of a venereal patient when the hospitalization was due to a nonvenereal disease.

TABLE 9.—*Hospital days*

	Number of patients			Hospital days			Average number of days per patient		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
Gonorrhea	551	521	[1] 452	13,943	20,437	17,109	24.85	39.23	37.85
Chancroid	57	80	53	1,399	2,371	1,784	24.54	29.64	33.66
Primary syphilis	50	34	[2] 31	1,566	1,319	1,263	31.52	38.79	40.68
Late syphilis	56	56	45	1,598	1,787	1,994	28.54	31.91	44.31
Total	714	691	581	18,506	25,914	22,150	25.92	37.50	38.12

[1] Including 3 patients discharged from the Coast Guard before the beginning of the year but remaining in hospital. These patients are included also in Table 9.
[2] Including 1 patient discharged from Coast Guard before the beginning of the year but remaining in hospital. This patient is included also in Table 9.

The general improvement in the venereal disease situation is reflected in Table 9, although the average period of hospitalization remained about the same in 1929 as in 1928. The shorter average period for 1927 was probably due in part to the greater number of men discharged on account of venereal disease during that year. Those men generally left the hospital after comparatively short periods of hospitalization.

There was actually a greater saving in hospital days than the 3,764 days shown by the table as there was an increase in the average number of men in 1929. The increase in personnel in 1929 was 314, and among this number of men at the 1928 rate, there would have occurred 29 additional cases. About 66 per cent of all cases were hospitalized; hence 19 of these additional cases would have been hospital cases, which at the average number of days in hospital would have made 724 additional hospital days. Therefore, we may consider that the reduction was approximately 4,488 in the number of hospital days.

Table 10 shows the number of days that venereal patients remained in hospital after discharge from the Coast Guard irrespective of the cause of discharge. Some of the patients were discharged during the preceding fiscal year but remained in hospital into 1929.

TABLE 10.—*Cases in hospital after discharge from Coast Guard*

	Patients			Days			Average days per patient		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
Gonorrhea	200	75	72	2,411	493	668	12.05	6.57	9.28
Chancroid	17	2	4	365	27	53	21.47	13.50	13.25
Primary syphilis	19	6	[1] 2	257	77	259	13.53	12.83	129.50
Late syphilis	17	17	12	255	178	145	15.00	10.47	12.08
Total	253	100	90	3,288	775	1,125	13.00	7.75	12.50

[1] See footnote (³) under Table 13.

Table 11 shows the number of days off duty, but not in hospital, although some of the same men were in hospital for the same disease at other times. The number of days is comparable to that for 1927 and considerably greater than for 1928. The 1928 number may have been abnormally low.

TABLE 11.—*Days off duty but not in hospital*

	1927	1928	1929
Gonorrhea	694	179	749
Chancroid	32	29	42
Primary syphilis	8	0	86
Late syphilis	19	3	32
Total	753	211	909

It is of special interest to the Coast Guard to know the amount of time lost through absence from duty on account of venereal disease. This is shown by Table 12, which includes the data shown by Tables 9 and 11, less those of Table 10. It differs from the number of hospital days shown by Table 9, which includes Table 10, but excludes the data of Table 11.

TABLE 12—*Days off duty while in Coast Guard*

	1927	1928	1929
Gonorrhea	12,228	20,123	17,190
Chancroid	1,066	2,373	1,773
Primary syphilis	1,317	1,242	1,090
Late syphilis	1,362	1,628	1,881
Total	15,973	25,366	21,934

Here again we must take into consideration the 19 hospital cases which would have occurred at the 1928 incidence rate with the increase of personnel, and the 724 days which these patients would have remained in hospital. More or less the same number of days of duty would have been lost to the Coast Guard; they should be considered in addition to the reduction shown in Table 12, making an approximate saving of time to Coast Guard of 4,156 days.

It is of some interest to note the longest periods of hospitalization as shown by Table 13.

TABLE 13.—*Longest period of hospitalization, in days*

	1927	1928	1929		1927	1928	1929
Gonorrhea	[1] 108	[2] 153	[4] 169	Primary syphilis	100	[3] 91	70
Chancroid	86	110	139	Late syphilis	163	114	[5] 258

[1] One other patient, in part of two fiscal years, was 165 days in hospital.
[2] One other patient had been 95 days in hospital on July 1, 1927, and remained 84 more days, a total of 179 days.
[3] One other patient had been 81 days in hospital on July 1, 1928, and remained there 247 days more, a total of 328 days.
[4] Remained in hospital 29 more days in next fiscal year.
[5] Remained in hospital 22 more days in next fiscal year.

The accompanying graph shows by months the admissions and readmissions to off-duty status for the three years. It gives a general idea of the number of men absent from duty all the time on account of venereal disease, making due allowance for the constant fluctuation.

The rates for 1928 and 1929 were appreciably less than the rate for 1927 in spite of the increase of personnel. It must be considered also that had the case incidence remained at the 1927 rate, the number of admissions as well as admission rate would have increased considerably in 1928 and 1929.

It is of interest to know the period of service rendered by men discharged while suffering with venereal disease. Table 14 gives the comparison for the three years. Men suffering with a venereal disease but discharged on expiration of enlistment, are not included.

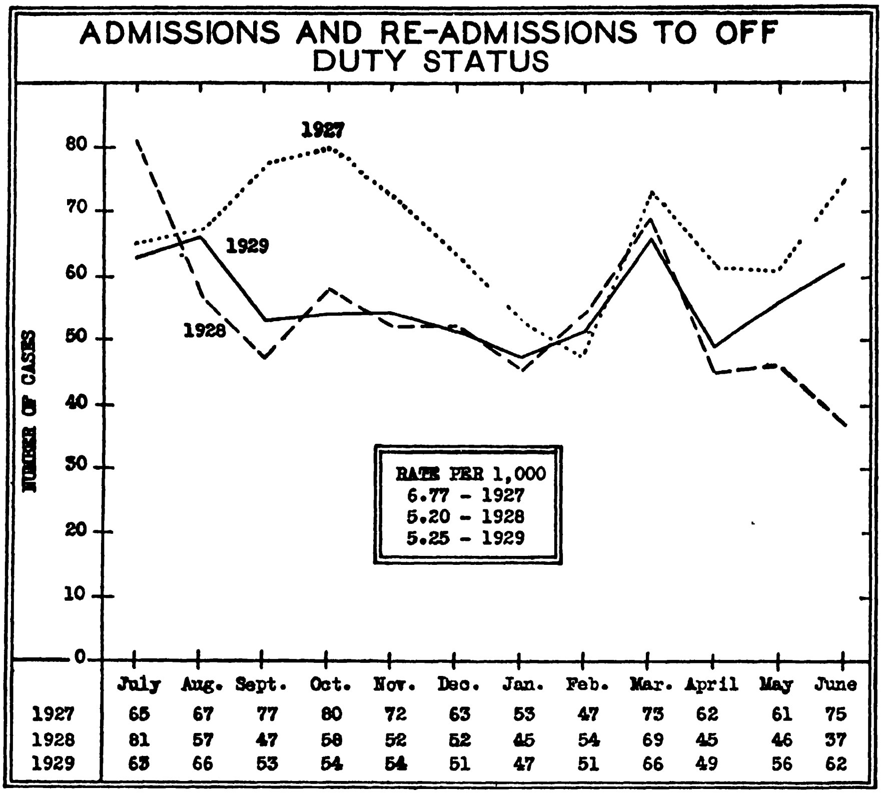

FIGURE 1.—Admissions and readmissions for venereal disease to off-duty status, by months, during the years 1927, 1928, and 1929

TABLE 14.—*Service of discharged men*

	1927	1928	1929
Less than 1 month	38	4	5
From 1 to 2 months	50	3	3
From 2 to 3 months	37	7	7
From 3 to 4 months	27	5	3
From 4 to 5 months	18	6	2
From 5 to 6 months	17	8	1
From 6 to 7 months	15	1	3
From 7 to 8 months	13	5	8
From 8 to 9 months	12	7	3
From 9 to 10 months	11	2	3
From 10 to 11 months	12	6	4
From 11 to 12 months	21	2	2
More than 1 year	115	44	40
Total	386	100	84

Table 14 shows close parallelism between 1928 and 1929, but does not show for those years as high a proportion of discharges after very short periods of services as occurred in 1927, in which year there was a relatively high incidence rate among men who had been in the Coast Guard but a short time, as indicated by the large number of men discharged with less than four months' service. It is evident that the practice in effect at that time, of discharging many of these men on account of venereal disease, materially increased the turnover in personnel. Other men were enlisted in their places and some of these may have been discharged in a short time for the same reason. It seems probable that the high rate of discharges, in 1927, of men having only a few months' service may have been influenced by the turnover in personnel.

Table 15 shows a slight reduction in 1929 from 1928 in the number of men who had venereal disease at the time of enlistment, and a much greater reduction from the figures for 1927. Late syphilis is not included, because of the uncertainty, in so many cases, of the time when the disease was contracted. The decrease in 1928 and 1929 is attributed largely to the efforts made to improve the making of physical examinations for enlistment.

TABLE 15.—*Men having venereal disease on enlistment*

	1927	1928	1929
Gonorrhea	35	8	7
Chancroid	1	0	0
Primary syphilis	2	2	0
Total	38	10	7

The data for 1927 showed that a very high percentage of the cases of gonorrhea, chancroid, and primary syphilis (excluding those contracted before enlistment) were reported within a comparatively short time after enlistment, particularly within the first year. The information for 1928 showed that this tendency was less marked and that there was a corresponding increase in the occurrence of cases in men of longer service. This tendency was even less marked in 1929. A comparison of the three years is shown in Table 16, based on the case rate per 1,000, so that variations in the number of men in each period automatically adjust the comparison.

TABLE 16.—*Case rate per 1,000 men in different periods of service*

Men in service—	1927	1928	1929	Men in service—	1927	1928	1929
Less than 1 year	213	155	110	From 2 to 3 years	22	52	67
From 1 to 2 years	79	104	71	More than 3 years	6	19	31

Table 16 shows a very marked reduction in 1929 in the rate for cases in the first period, less so for the second period, and a marked increase for the last two periods. This may be interpreted to indicate that the year's reduction in the actual number of cases took place chiefly among first year men, and that the statistics for the year would have shown a greater reduction had it not been partially offset by an increase among men with more than two years of service. The rates are based upon the number of men in each period about the middle of the fiscal year, as representative of the average number for the year.

It is probable that several factors have operated to cause the shift in rates shown in the table. We can not know and fix the influence of each factor, but we may seek the possible effect of those factors which we know. For the high incidence of cases among recently

enlisted men in 1927, a plausible explanation, at least in part, was found in certain commonly existing factors. The first or second pay day may provide means for the gratification of desires held in abeyance by the lack of financial means, and frequent exposure is likely to follow. Opportunities are not lacking, because a man on shore liberty is assumed to have sufficient money and the opportunity seeks him. Many are young men, often inexperienced and in unfamiliar surroundings. Not "knowing the ropes," they follow the most open paths and find the most accessible opportunities usually the most dangerous.

A great proportion of the turnover in personnel is first enlistments, and among those men an unknown number would be affected by the factors mentioned. It seems possible, therefore, that a large turnover might affect the venereal disease rate, especially among recently enlisted men. The turnover in enlisted personnel in the Coast Guard was 10,021, 6,460, and 6,862 for the fiscal years 1927, 1928, and 1929, respectively, and it seems probable that the smaller turnover in 1928 and 1929 may have had an influence in reducing the number of cases among first-year men.

An additional influence may be credited to the venereal disease control measures which have been mentioned. Certain medical officers have paid special attention to the avoidance and prevention of infection among recruits.

Equally plausible causes for the increased rates for men in service more than two years are not so readily apparent. A certain type of man is likely to contract a venereal disease again and again, profiting little by experience; and the retention of such men in service seems to be a possible factor in the increased rates under discussion. About 12 per cent of the patients whose cases were used for the computations for 1929, had records of a previous venereal infection. Of these, about 1⅓ per cent were in the first period, about 3½ per cent in the second period, and over 7 per cent in the third and fourth periods. The effect of the retention of these men in service was most appreciable in the third and fourth periods, and has had a certain amount of influence in raising the rates for those periods. The retention of these men in service would reduce turnover, but it has caused a certain amount of increase in the rates for the third and fourth periods. This seems at first glance to be paradoxical, in view of the previous credit given to less turnover for reduction in the rate for the first period; but the tendency of the less turnover to increase the rate is much less marked than is its tendency to decrease it; and, furthermore, the increase is manifested in the later periods, because there was usually an interval of more than one year, often several years, between attacks, during which time the man had passed from the first period to a longer one.

Another factor may be mentioned: There are indications that there is now less concealment of cases, particularly among men of longer service, as the interest aroused in venereal diseases has the effect of bringing cases to treatment. No doubt there are other factors at work, but their causative relation is too obscure to be worth discussion at present.

Recognizing that the danger of venereal infection is serious in any large port, it is of considerable interest to know, if possible, those ports in which the danger is particularly great. For this reason an attempt has been made to estimate and tabulate the incidence rates for a number of ports at or near which an appreciable number of Coast Guard men are stationed.

The lack of definite data as to the place where infection was acquired and the frequent variations in personnel at a given place necessitate a considerable assumption on this point. . It must also be remembered that the numbers with which we are dealing are relatively small, so that a slight difference of a very few cases may make a relatively large difference in the rate. However, with these limitations, Table 17 has some value. It is based on 555 new cases of gonorrhea, chancroid, and primary syphilis in which the place of infection may be assumed with fair probability among approximately 7,500 men.

TABLE 17.—*Incidence rates per 1,000 at ports*

	1927	1928	1929		1927	1928	1929
New London	74	40	30	Galveston	271	233	66
New York	108	93	68	Portland, Me.	291	65	123
Boston	113	73	94	St. Petersburg	[1]	38	97
Norfolk	142	103	73	Fort Lauderdale	[1]	54	28
San Francisco and Oakland	86	60	122	Wood's Hole	[1]	46	34
Baltimore	193	223	111	Charleston, S. C	[1]	183	244
Seattle	83	140	181	Cape May	[1]	28	17
Biloxi	54	61	33	Pascagoula	[1]	[1]	88
San Pedro	100	33	129	Savannah	[1]	[1]	97
Key West	130	115	117	Fernandina	[1]	[1]	65
Wilmington, N. C	136	173	111	Juneau	[1]	[1]	92
Mobile	188	200	189				

[1] Not given.

New cases reported have been tabulated on the basis of the unit to which the patient was attached when infection apparently occurred. The resulting rates of incidence for each unit in different years and for different units under comparable circumstances, varied so greatly that as yet they are not of sufficient value to cite. Evidently those rates are influenced by many factors which are obscure and require further study.

As the grouping of men by ratings may indicate in a general way some differences in types of men, their habits, environments, etc., which may have a bearing upon the occurrence of venereal disease, the incidence rate by ratings has been tabulated in Table 18. The rate is per 1,000 men, based upon the average strength of each rating for the year. Cases of all kinds are included.

TABLE 18.—*Rates per 1,000, by ratings*

	1927	1928	1929		1927	1928	1929
Boatswain's mate	29	38	23	Water tender	97	101	70
Coxwain	191	126	100	Engineman	77	102	107
Gunner's mate	78	97	68	Fireman	265	171	162
Quartermaster	86	60	72	Yeoman	66	45	50
Seamen	175	175	154	Storekeeper	86	60	53
Surfman	19	26	30	Pharmacist's mate	28	0	38
Electrician's mate	205	33	29	Commissary steward	75	77	39
Radioman	85	89	44	Ship's cook	108	108	123
Carpenter's mate	81	61	70	Officer's steward	98	85	70
Machinist's mate	60	57	48	Mess attendant	326	235	239
Motor machinist's mate	62	52	44				

It is a cause for considerable satisfaction that the improvement in the conditions noted in the figures for 1928 continued during the fiscal year ended June 30, 1929. It seems justifiable to attribute this in large measure to increased interest in the subject, better appreciation of its importance, and greater effort to avoid or prevent infection. It is to be hoped that the improvement will continue until the irreducible minimum is reached. There is no reason to believe that the present conditions are the best attainable.

SUMMARY AND COMMENT

In this review of the existing conditions, three outstanding facts should receive attention: The reduction in the actual number of cases, and in the incidence rate, notwithstanding an increase in the number of personnel; the reduction in the number of hospital days for 1929; and the reduction of the amount of time lost to the Coast Guard.

The figures for 1928 showed a reduction of 73 in the actual number of cases from 1927, and the figures for 1929 showed a further reduction of 79 cases. In each year there was an increase in the number of enlisted men, and had the 1927 incidence rate continued in 1928 and 1929, there would have occurred 139 more cases in 1928 and 251 more cases in 1929, instead of the decrease which actually occurred. The incidence rate per thousand fell from 105.64 for 1927 to 92.21 for 1928 and to 82.12 for 1929. Considering only new cases reported, their number was 136 less for 1928 and 70 less for 1929 than for 1927; and the incidence rate fell from 98.77 for 1927 to 79.88 for 1928 and 70.98 for 1929.

The number of days in hospital and of time lost to the Coast Guard rose sharply in 1928, and the average stay in hospital was notably longer. Sufficient explanation of this is not readily apparent, but the retention of many men in service in 1928 instead of discharging them, as in 1927, had considerable effect in producing the result, because the discharged men remained a comparatively shorter time

in hospital after discharge than did the men retained in service; and, of course, when a man was discharged his loss of time ceased to be charged to Coast Guard time.

The figures for 1927 may have been normal for conditions which prevailed during the greater part of that year, whereas under the changed conditions prevailing during 1928 and 1929 the figures for those years seem more nearly comparable. The average stay in hospital changed but slightly, but there was an actual saving of 4,488 hospital days—an appreciable economy.

The time lost to the Coast Guard may be considered from the same point of view. For 1929 there were actually 3,432 less days lost than for 1928, to which should be added the number of cases which would have occurred had the 1928 rate obtained with the increase in personnel. It would be approximately the same as the corresponding saving in hospital time, i. e., 724 days, making a total saving of time to the Coast Guard of 4,156 days. This represents an appreciable saving in efficiency, a point which should appeal strongly to the Coast Guard officer who is hampered in the performance of his duty by the absence of any member of the unit's complement, and also to the enlisted man who is called upon to do extra duty because of the absence of his shipmate.

It has been frequently said to me that the Coast Guard loses nothing financially when a man is off duty on account of venereal disease. This would be economy at the expense of efficiency, which has not been advocated even in the most insistent appeals for economy. Moreover, the suggestion that the Coast Guard suffers no financial loss in these cases is only partially true, because certain men continue to receive pay, others receive a small allowance, travel expense is incurred, and in the case of a discharged man there is mileage to be paid and the expense of enlisting another man in his place.

It is not believed that the present conditions regarding venereal diseases in the Coast Guard are the best attainable. On the contrary, it is considered that the application of preventive measures can be improved and extended with still further beneficial results. It is not to be expected that these diseases can be entirely eliminated; and as the number of cases is reduced, it will become increasingly difficult to reduce them further.

MILIARY LUNG DISEASE DUE TO UNKNOWN CAUSE[1]

By R. R. SAYERS, *Chief Surgeon,*[2] *U. S. Bureau of Mines,* and F. V. MERIWETHER, *Surgeon,*[3] *U. S. Bureau of Mines*

INTRODUCTION

In the spring of 1927, the United States Bureau of Mines, the Metropolitan Life Insurance Co., and the Tri-State Zinc and Lead Ore Producers Association agreed to maintain cooperatively a clinic at Picher, Okla., for the study and control of silicosis and tuberculosis among the miners. Physical examination, including X-ray examination of the chest, is made of the men prior to employment and at least once yearly thereafter. A total of 18,285 individuals had been examined up to and including December, 1929. Early in the work an occasional case was encountered in which the Röntgenograms appeared to be those of miliary tuberculosis; but in many cases the history was practically negative, without symptoms, and, with two exceptions, all subjects were apparently healthy.

Grateful acknowledgment is made to Dr. A. J. Lanza for his interest and assistance in securing information in regard to similar cases, to Dr. Charles Thom, of the United States Department of Agriculture, for his advice and valuable work in identifying the fungus, and to Surg. R. E. Dyer, of the National Institute of Health, United States Public Health Service, for preparing antigens used in the skin test.

The following is a summary of 125 case histories.

PERSONAL DATA

Age.—The cases ranged in age from 16 to 69 years. A tabulation into 10-year groups shows that 3.2 per cent were under 20 years of age, 36 per cent were between 20 and 30, 35.2 per cent between 30 and 40, 16.8 per cent between 40 and 50, 7.2 per cent between 50 and 60, and 1.6 per cent were 60 or over. The greatest number of cases occurred between 20 and 30 years of age and the next greatest between 30 and 40 years. These figures indicate that the greatest number of cases occurs in the years in which adult tuberculosis is most common.

Race.—With one exception, an Indian, the subjects were all white native-born Americans. The majority were born and reared in the vicinity of the mining field. A tabulation of the places of birth shows that about 90 per cent were born in Missouri, Oklahoma, Kansas, Arkansas, and Illinois. Most of the subjects came from rural districts or had spent several summers in the harvest fields.

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[1] Presented at the meeting of the National Tuberculosis Association, Memphis, Tenn., May 8, 1930. Published by permission of the Director, U. S. Bureau of Mines.

[2] Surgeon, United States Public Health Service.

[3] Passed Assistant Surgeon, United States Public Health Service.

Family history.—Although the study covers 125 cases, the family histories of only 54 were secured in detail. These were tabulated and the results are shown in the accompanying table.

Member of family	Living	Dead	Cause of death (per cent)													
			Senility	Diseases of heart	Paralysis	Accidents	Pneumonia	Tuberculosis	Influenza	Typhoid fever	Nephritis	Cancer	Childbirth	Whooping cough	Measles	Cause not given
Father	47.0	53.0	3.9	5.8	-----	1.9	13.7	5.8	1.9	7.6	1.9	-----	-----	-----	-----	9.5
Mother	54.8	45.2	5.8	5.8	1.9	-----	7.6	1.9	1.9	-----	-----	-----	1.9	-----	-----	15.6
Brother	63.0	37.0	-----	-----	-----	7.4	3.7	3.7	3.7	5.5	-----	-----	-----	3.7	3.7	3.7
Sister	70.4	29.6	-----	-----	3.7	1.8	1.8	-----	1.8	1.8	-----	1.8	-----	3.7	3.7	9.2

The table shows that the death rate from pneumonia is twice as great for fathers as for mothers and the death rate from tuberculosis is three times as great for fathers as for mothers. The deaths from tuberculosis in the families of the subjects under discussion are approximately the same as in the families of metal miners in this district. Further, the number of subjects themselves who have had pneumonia is approximately 30 per cent higher than in miners.

Past history of diseases.—The subjects gave histories of the usual diseases of childhood and adolescence. In only two instances, namely, pneumonia and influenza, did the number having such diseases exceed the normal for the mining industry in this locality. The other respiratory diseases, such as pleurisy, hay fever, asthma, and acute bronchitis, were approximately 50 per cent less frequent than among the miners.

Occupational history.—The first reaction on reading the Röntgenographs of these men was that their condition was associated with mining; but on closer study of the histories it was found that 8 per cent had never worked in or around mines and that 3.2 per cent had worked on farms all of their lives. Of those giving a mining history, 18.1 per cent had worked less than 1 year in the mines; 18.1 per cent from 1 to 2 years; 12.7 per cent from 3 to 4 years; 12.8 per cent from 5 to 6 years; 6.3 per cent from 7 to 8 years; 6.3 per cent from 9 to 10 years; 5.3 per cent from 11 to 12 years; and 20 per cent over 12 years.

The past occupations given by the men show that 54.4 per cent had been farmers, while only 23 per cent of all the miners in the district came from farms; that 12.8 per cent had been in school; and 31.2 per cent had been oil-field workers, pulp-mill workers, mechanics, and teamsters. With but two exceptions, the farms from which the men came were located in the wheat belt. The two exceptions were farms raising corn or alfalfa. The subjects who had not worked on

farms came from agricultural communities and, with but one exception (a pulp-mill employee), from sections producing large amounts of wheat and hay.

SYMPTOMS

Many of the subjects (65.6 per cent) gave no symptoms at all. Of the remainder (34.4 per cent) the following percentages gave the symptoms stated: Cough, 53.3; dyspnea, 62.6; expectoration, 18.5; hemoptysis (blood-tinged mucus), 11.6; loss of strength, 39.4; loss of appetite, 13.9; night sweats, 6.9; fatigue, 3.1; and pain in chest, 18.5.

A study of the Röntgenograms and histories of an investigation of miners' phthisis, carried out in this district in 1927, revealed six subjects with the undiagnosed condition. Their symptoms and Röntgenograms have remained about the same, except in one case which showed some improvement. Observation on the cases to date indicates that many cases have no symptoms; but when symptoms are present the most common are dyspnea, cough, and the expectoration of blood-tinged mucus. The symptoms apparently remain stationary, or tend toward a slight improvement.

PHYSICAL EXAMINATION

The records of the physical examinations show that 87.2 per cent of the subjects were apparently healthy; 12.8 per cent pale or emaciated; 65.6 per cent were robust; 12.8 per cent fair; and 21.6 per cent not given.

The weight of the subjects ranged from 112 pounds to 187 pounds (with clothes on), averaging 150.1 pounds. They gave their usual weight as from 125 to 185 pounds, averaging 151.4. A study of the histories shows that at the time of examination 12 per cent were under their usual weight by 10 or more pounds, and 2.4 per cent were underweight by 20 or more pounds. One subject showed a gain of 5 pounds.

The height of the subjects varied from 60 to 75 inches, averaging 68.7 inches.

The pulse rate of the subjects averaged 83 per minute taken before exercise and 88.3 per minute taken after exercise (exercise consisted in stepping on a chair twenty times in 30 seconds). The pulse rate averaged 5.3 beats above normal after the subjects had rested for 2 minutes; in 56.1 per cent of the subjects it did not return to normal within 2 minutes, in 23.4 per cent it returned to normal, and in 13.5 per cent it dropped below normal within 2 minutes. The reaction of the remaining 7 per cent is not stated.

The respiration averaged 17.8 per minute before exercise and 19.8 after exercise (exercise the same as above), an increase of two respirations per minute after 2 minutes' rest; 47.3 per cent did not return to normal after 2 minutes' rest; 27.4 per cent returned to normal,

and 12.1 per cent dropped slightly below normal. The reaction of the remainder was not stated. The respiration and pulse rate after exercise indicated some dyspnea in approximately one-half of the cases.

The average blood pressure was 126.9 mm. systolic, 79.6 mm. diastolic, and 47.3 pulse pressure. The blood pressure of 8 per cent of the subjects was above 150 mm. systolic. Four subjects had a low blood pressure (below 100 mm.).

Examination of the eyes, ears, and teeth disclosed little variation from the other males of the district of the same age groups.

The lung expansion varied from one-half inch to 6 inches, averaging 2.8 inches. In 4.8 per cent the expansion was 1 inch or less; in 29.6 per cent, it was from 1 to 2 inches; in 37.2 per cent, from 2 to 3 inches; in 19.6 per cent, from 3 to 4 inches; and in 8 per cent, over 4 inches (one 6 inches). The average lung expansion corresponds closely to that of miners with silicosis uncomplicated with tuberculosis. First degree silicotics have a lung expansion of 2½ to 3½ inches, second degree 2 to 2½ inches, and third degree 2 inches or less, averaging about 1½ inches.

Inspection of the chests showed that 88.8 per cent were normal in shape, 3.8 per cent were flat, and 6.3 per cent were barrel shaped. Four per cent had superclavicular retractions and 2 per cent had sternal retractions. In each instance the retractions were marked, especially in the cases with sternal retractions. This condition was very noticeable in these cases, but was not considered to be associated with the disease under discussion.

Palpation showed 3.2 per cent with a decided increase in vocal fremitus over the entire chest. Two per cent showed diminished fremitus over the entire chest.

Percussion of the chest showed that 8 per cent had a slight dullness on one or both sides. This dullness was located in the upper section of the chest in the majority of cases.

The physical signs found on auscultation varied considerably in the different individuals, resembling closely the signs occurring in silicosis. The breath sounds in 48 per cent of the cases were harsh, rough, bronchial, or bronchovesicular in character over the entire chest; 8 per cent were harsh and rough in the upper half and weak in the lower half. The voice sounds in 6.6 per cent of the subjects were increased, more often in the upper half of the chest.

Râles were found in 23.2 per cent of the cases; in 13.4 per cent at the bases of the lungs, in 5.8 per cent at the apices, and in 4 per cent they were scattered. When râles were found, they were usually of the moist, mucus type. Three cases had semifine persistent râles heard at the apices, after an expiratory cough; in two of these cases

the Röntgenogram showed some evidence of active tuberculosis. In only four cases did the râles persist after coughing.

The heart examination was negative in all cases.

RÖNTGEN FINDINGS

A study of the Röntgenograms shows a decided enlargement of the hilum shadows in 91.2 per cent of the cases and a slight enlargement in 7 per cent. The shadows are very dense and in 15 per cent of the cases contain one or more large calcified spots in the hilum. In one patient these spots were so numerous that the entire hilum appeared to be filled.

The lineal markings, while somewhat more pronounced than in the average metal miner, are not as noticeable as in early silicosis. The markings extend to all parts of the lungs, but are more noticeable in the lower two-thirds, appearing to increase toward the bases. In 16.3 per cent of the patients, "budding," or early mottling along the bronchial tree, was noticed, indicating beginning silicosis. These patients had been working in lead and zinc mines for several years, and the fine mottling was probably due to silica dust.

The most characteristic finding was the large number of discrete, dense, shotlike spots scattered over the lungs. An effort was made to count the spots on flat pictures. The tabulation shows spots as follows: 28.8 per cent of the subjects had less than 25, 27 per cent from 25 to 50, 11.1 per cent from 50 to 75, 7 per cent from 75 to 100, 10.6 per cent from 100 to 200, 9.6 per cent from 200 to 300, 3.6 per cent from 400 to 500, and 1.6 per cent over 500. In 94 per cent of the cases from 55 to 95 per cent of the spots were located in the bases. They were scattered about equally over the lung area in 6 per cent of the cases. The cases can be divided roughly into two groups—those with large spots and those with small spots. The large spots vary in size from 4 mm. to 1 cm., averaging about 6 mm. They are not so numerous as the small spots, and appear to be more dense, discrete, and symmetrical. The large spots are mostly in the bases (average 80 per cent). The small spots vary from 1.5 mm. to 5 mm., averaging 3 mm. They are fairly dense, round, and uniform. They are occasionally seen against the heart shadows, where they closely resemble lead shots of about a No. 8 size.

A review of the Röntgenograms of the clinic shows that 29 of the cases have been returning at various intervals during the past two or three years. One case shows a decrease in the number of spots in the lungs, has gained weight, and is no longer short of breath. The other cases are about the same as when originally examined. The majority of the cases have been reexamined from six months to one year apart, and in only two cases (tuberculosis cases) has any decided change for the worse been noted.

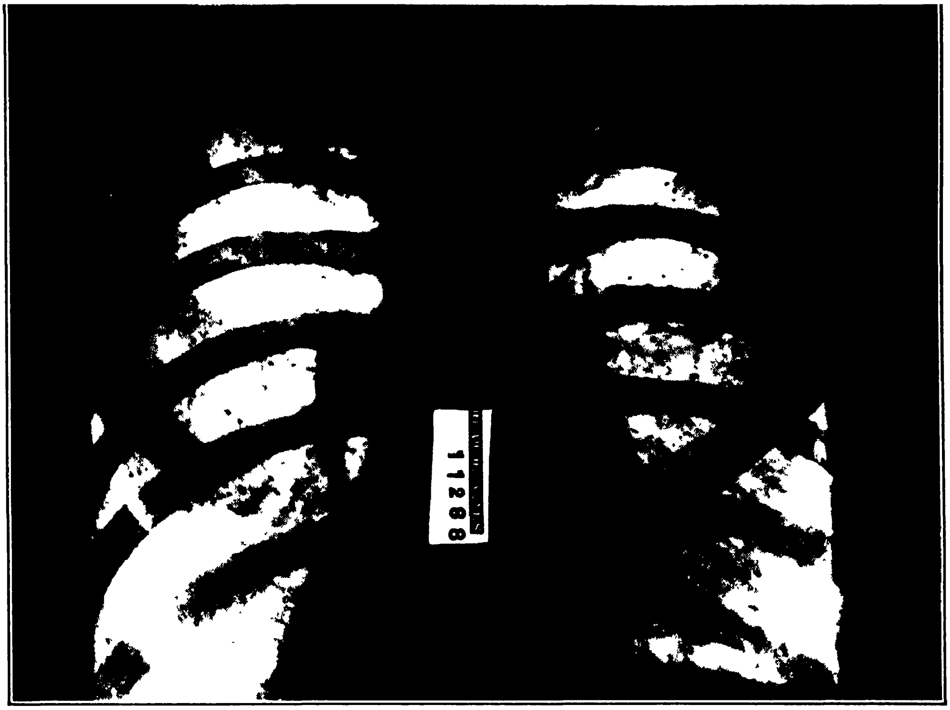

FIGURE 1.—See text for case history

FIGURE 2. Case No. 10908. One examination. Date of examination, August 28, 1928. Age 25. Born in Arkansas; married; smokes. Past history of disease: Measles. Occupational history. Six months in lead and zinc mines; before that, cotton farming. Present history negative. Physical examination shows appearance good; development robust; present weight, 143; usual weight, 141; pulse rate, 120; respiration, 11; blood pressure, 130/100; chest, 33/36; findings negative. Wassermann negative. X ray: Lungs show numerous calcified spots throughout

FIGURE 3—Case No. 1609. Five examinations. First examination, January 26, 1927. Age, 26. Born in Arkansas. Gives history of using alcohol, tobacco, and coffee. Past history shows mumps, whooping cough, measles, chicken pox, malaria, pneumonia, coryza, acute bronchitis. Present history negative. Gives occupational history of 2½ years in lead and zinc mines. Physical examination shows weight 151; pulse rate before exercise, 90, after exercise, 102; respiration before exercise, 20, after exercise, 30; blood pressure, 118/82; chest measurement, 32/35; findings negative. X ray diagnosis negative, except for numerous calcified spots in both lungs.
Second examination, October 11, 1927. X ray negative, except for spots.
Third examination, March 15, 1928. Negative, except for calcified spots.
Fourth examination, May 3, 1929. Four-plus Wassermann and Kahn. Treatment begun May 16. X ray of chest negative, except for calcified spots.
Fifth examination, December 28, 1929. Weight 153. Examination negative, except for calcified spots. Had had 12 treatments of neoarsphenamine and 18 of mercury. Kahn negative.

LABORATORY FINDINGS

A careful laboratory study was made of 88 cases. Two cases showed tubercle bacilli, and 7 had four plus Wassermanns. The blood counts showed the red blood cells to be normal in number, color, and size. The white blood cells in all but two cases ranged from 5,000 to 10,000 per cubic mm., averaging 9,700. The two exceptions had a count of 10,900 and 14,000, respectively. The differential count showed the polymorphonuclear neutrophiles to range from 58 to 75 per cent, the large lymphocytes from 1 to 4 per cent, the small lymphocytes from 28 to 35 per cent, the transitionals from 1 to 4 per cent, and the eosinophiles from 1 to 3 per cent. The bacteriological examinations of the sputum of the first 10 or 12 cases were considered to be negative. In an unstained smear a fungus was found, and 30 cases since examined all show a fungus. Media plates show an abundant growth of a superficial character after three or four days at 37° C. There are two types identified by Doctor Thom as *Aspergillus fumigatus fisheri* and *Aspergillus niger*. Doctor Thom suggested that antigens be prepared from the cultures.

An antigen of the *Aspergillus fumigatus fisheri* and later an antigen of the *Aspergillus niger* were prepared by Surgeon Dyer of the National Institute of Health of the United States Public Health Service. These antigens were used in a dermal test to find out whether any sensitization occurred. Ten cases were tested with *Aspergillus fumigatus fisheri* and all showed negative results. An antigen of the *Aspergillus niger* was used in six cases and a marked positive reaction obtained in each case. Each of these cases was tested at the same time with the antigen of the *Aspergillus fumigatus fisheri* and in one instance a weak reaction occurred.

An attempt was made to find the same fungi in the mouths or sputum of men working in or around the mines, and in one instance a similar organism was found. As the organism was not commonly found in miners, cultures of mine dust were made, with negative results.

TYPICAL CASE

A typical case is given in order to illustrate more clearly the findings, or rather the absence of physical findings.

Case No. 11288 (fig. 1): A white male, 39 years of age, married and father of four children. Born in Virginia. Had never lived or associated with a tubercular patient to his knowledge. Gave a history of having had mumps, scarlet fever, whooping cough, measles, diphtheria, smallpox, and influenza; denied history of any venereal disease.

Occupational history: Patient had worked as a shoveler in the lead and zinc mines for one year. Past occupation, wheat farmer for

entire life. Gave a negative history for cough, shortness of breath, expectoration, spitting blood, loss of strength, loss of appetite, pain in chest, night sweats, and fatigue.

Physical examination showed the man to be of good appearance, plethoric, average development, well nourished, weighing 160 pounds stripped, 70½ inches tall. Sitting pulse rate 72, respiration 18. After exercise (stepping on chair 20 times in 30 seconds) pulse returned to 74 and respiration to 18 after two minutes' rest. Blood pressure was 120 systolic, 60 diastolic, and 60 pulse pressure. Eyes negative, hearing negative, throat negative, nose negative, teeth clean and sound, with none missing, decayed, or artificial. No pyorrhea.

The chest examination showed an expansion of 3 inches, normal in shape; inspection, palpation, percussion, and auscultation were negative. This man was reexamined 2 months and 18 days later, and the chest was negative for all findings.

The heart was negative, abdomen negative, no glandular enlargements, extremities negative; genito-urinary system, and skin were negative.

The X-ray examination shows hilum shadows enlarged, small amount of lineal markings and small spots about 1.5 to 4 mm. in size scattered over the entire lungs. The flat picture shows 564 spots, discrete, symmetrical spheres, 70 per cent of which are at the bases of the lungs.

The laboratory findings show red cells 4,720,000, white cells 9,200, hemoglobin 87 per cent, differential count; polymorphonuclears 64 per cent, large lymphocytes 2 per cent, small lymphocytes 33 per cent, transitionals 1 per cent; Wassermann negative; sputum negative for tubercle bacillus but shows a fungus-like organism. The case is interesting in that it shows marked chest findings on Röntgen examination, with very few symptoms of disease.

It was impracticable in the work at Picher, Okla., to use the tuberculin test or to obtain autopsies on any of these subjects because of probable labor disturbance.

DISCUSSION

In making a diagnosis one would probably think of miliary tuberculosis, pneumonoconiosis, calcium metastasis, or pneumomycosis. The present knowledge and conception of these diseases do not coincide entirely with the physical and Röntgenogram findings of the cases under discussion.

Miliary tuberculosis.—The known high rate of tuberculosis in this district and the Röntgen findings would suggest that the disease might be miliary tuberculosis. The cases, with two exceptions, appear healthy and show few, if any, symptoms or physical signs of miliary tuberculosis. The cases that have returned for reexamina-

tion show that the condition has remained stationary in all cases except three, one showing some improvement and two having developed pulmonary tuberculosis.

Marlow (1) gives a brief review of 36 fairly authentic cases of miliary tuberculosis that he found in the literature. He calls attention to Northnagel's belief that many more cases recover than is realized, because the diagnosis is rarely made if the patient improves. More recently, Opie (2) has called attention to the same idea, emphasizing the fact that cases are not always fatal. With the increasing frequency of more or less routine chest X rays in some of the larger hospitals, he thinks we may expect to find more and more instances of inactive miliary tuberculosis and that it is possible that not many years hence the prognosis in generalized tuberculosis may be found fairly hopeful in an increasing percentage of cases.

Marlow states that the number of cases cited is not imposing, but that it need only be pointed out that the character of the disease is indefinite, as are the general opinions regarding it. Suggestive physical signs are rarely found; the story is vague; and the medical profession is educated to the belief in the invariable fatality of the condition. The following is a summary of the cases Marlow found in the literature. A number of these are probably not true miliary tuberculosis, although classed as such by the authors.

In 1860 Wunderlich reported a death from an intercurrent illness in a patient whose case had been diagnosed as miliary tuberculosis four months previously; autopsy confirmed the presence of the acid-fast infection. Six years later, Sick stated that he had found healed miliary tuberculosis in the lungs of a stonemason. As all the lesions were of the same size, he believed that they were probably not inhaled particles of stone. Burkhart mentioned instances of miliary tubercles in which the character of the tubercles furnished evidence that they had existed for a considerable time before death. In addition to these, Longscope, in a study of 19 cases of generalized tuberculosis, reported 8 that had a course sufficiently prolonged to be considered subacute or chronic. However, none of these cases lasted more than a year. Opie noted a case of healed miliary tuberculosis coming to autopsy as the result of *Streptococcus viridans* endocarditis. He concluded that although absolute proof of the nature of such lesions is impossible during life, in all probability they represent healed tuberculosis. He believed that miliary tuberculosis, contrary to the generally accepted opinion, occasionally takes on a chronic form and may heal with or without calcium deposit. Von Muralt reported two cases which eventually came to section as a result of meningeal involvement. In recent years the increased frequency of X-ray examination has brought to light more and more instances of miliary tuberculosis in persons not acutely ill. One of these cases was de-

scribed by Northrup in a paper presenting eight cases of generalized infection diagnosed by Röntgen examination as miliary tuberculosis. Similarly, cases have been reported by Kahn, Baer, Stivelman and Henneil, Blaine, Bierman, Kilngenstein, Pierson, Maendl, Wallgren, and Mason and Nather. Marlow calls attention to a few cases of particular interest, such as the case of Preston and Jeaffreson with its associated evidences of Mikulicz's disease. Middleton reported a case with coincident syphilis, but gave no comment upon the effect of antisyphilitic treatment. Kahn found typical radiographic evidence of miliary tuberculosis of the right lung only, and was able a year later to demonstrate tubercle bacilli in the sputum.

In a paper emphasizing the value of serial X-ray examinations of such patients Sante (3) reported two cases, one dying after an illness of seven months and the other after about three months' illness. In the first case radiographic examination revealed an extensive miliary tuberculosis of the lungs distributed in both lung fields. Autopsy revealed generalized miliary tuberculosis. X-ray examination of the second case revealed numerous small, soft infiltrations, uniformly distributed throughout both lungs, the typical picture of miliary tuberculosis. Sante remarks that every radiologist has encountered instances in which numerous minute shotlike calcareous deposits are seen in the lungs. Their symmetrical generalized distribution leads one to think that they may be due to healed lesions of miliary tuberculosis. A considerable number of such cases has been encountered and an effort has been made to ascertain the cause. The age of the patient does not seem to be a determining factor, according to Sante, as he encountered the condition twice in children 12 years old. That the condition does not represent any active disease was evidenced by serial radiographs taken of a patient showing this condition in which no change was noted in the calcareous deposits during a period of nearly a year.

Sante considers that while this condition has been regarded as healed tuberculosis lesions of a disseminated pulmonary type, there is no adequate reason why it might not represent a healed lesion of the generalized miliary type of tuberculosis. He had hoped that the chronic case he described, owing to the mildness of the symptoms, might prove to be of this type and that he would be able to obtain a complete series of examinations showing the course of the disease from the stage of first appearance of the tubercles to the stage of calcification. Only by such an observation will the true character of this condition be definitely established. Until this time he thought there was sufficient authority in the opinion of able pathologists and Röntgenologists for a provisional diagnosis of healed miliary tuberculosis.

Pierson (4) describes three cases. In one case the healing proceeded by absorption rather than by calcification. In a case lent to him by Dr. Eugene Kilgore the X ray showed a fine uniform mottling throughout the upper half or two-thirds of both lungs. A comparison film taken eight months later showed essentially the same condition, evidently quiescent. Six months later the patient's left kidney and epididymus were removed because of tuberculosis; otherwise he remained well. In the third case described by Pierson physical examination was negative except for the chest, which showed a few fine crepitant râles at the right apex and signs of cavity at left apex; X ray showed calcified nodules scattered throughout all five lobes. There was a cavity at the left apex. This last case, according to Pierson, showed the picture of a disseminated tuberculosis throughout the lungs, which healed by calcification, except for a cavity at the apex which may have existed before this disseminated condition took place. In fact, in adult life generalized miliary tuberculosis develops by the breaking through of some focus, frequently a cavity, into the blood-stream. Its arrest and healing in this case were due to there being present sufficient immunity to localize the disease. Whether or not any other organs became involved at that time and showed healed tubercles, he could not say, for it was not possible to make so extensive an examination.

Pierson calls attention to other cases of a diffuse tuberculosis in the lungs in which a blood or lymph borne infection appears quite possible, but these when localized in one or two lobes are more often due to the bronchopneumonic or contact method of implantation. The most common diseases to consider in differential diagnosis are diffuse bronchopneumonia, pneumonoconiosis, and coccidioidal granuloma. A short period of observation will rule out the first; and with a history of such occupational hazards as produce the second the diagnosis of miliary tuberculosis would be very unwise. Pneumonoconiosis, when associated with tuberculosis, practically always leads to the massive bronchopneumonic type. Coccidioidal granuloma generally breaks down and the microorganisms are found in the sputum.

Blaine (5) calls attention to the paucity of clinical symptoms, which he explains as due to the fact that in the phlegmatic individual it is difficult to elicit any history of an acute sickness in the ordinary sense, as he is prone to overlook or underestimate the importance of a period in which he did not feel well, his appetite was not up to normal or he seemed to lack his usual "pep" for a few days or a week or two, and he may have paid no attention to such a physical decline, and, following this uncertain period, recovered his former more or less normal condition. On the other hand, the high-strung, or neurotic, type of person most often recalls such a period in which he had to lie down or go to bed for a few days, later getting along all right, often

without recourse to the physician. In such cases one is less reluctant to believe that an acute miliary tuberculosis is a possibility. A rise in temperature may not be recognized by a person of the former group, who often have an increase of two or more degrees without realizing it, while the latter invariably know that they have fever. Headache, malaise, and the usual accompaniments of temperature increase are a part of the story of the more highly strung person, while the phlegmatic individual invariably fails to note such occurrences. Blaine mentions as one of the chief points in his observation that an active tuberculosis can be present in the intervening areas, but that, when these areas which lie between the individual dense shadows under discussion are of normal transparency to the Röntgen ray, it is safe to assume this particular tissue to be normal, especially if there be no clinical evidence of a pulmonary disease at the time of the Röntgen examination. He found a varying number of these lesions present in the different cases; in one case the multiple spots were so close together that very little of the lung field could be visualized, literally thousands of foci being evident; in another case, the foci were so far apart as to make it doubtful whether the case could be properly considered a disseminated miliary tuberculosis. He reminds us that the term "miliary" usually refers to the size of the tubercle, and that there may be but a very few of such miliary tubercles, or, on the other extreme, so many as to startle the observer when he views the case Röntgenologically. Here enters the probability of an involution of the majority of the tubercles, a few only undergoing calcification. The individual lesion, however, is in both instances substantially the same. While it is true that the calcified tubercle is not in itself a positive sign of a preceding active tuberculosis, Blaine thinks that the greater incidence makes the probability so great that we may assume such to be the case.

In a discussion of Blaine's paper, the consensus of opinion was that there is no proof that these lung findings represent healed miliary tuberculosis, but that after all this seems the most reasonable explanation. Several cases were reported with Röntgen findings closely resembling those seen in Doctor Blaine's cases. Doctor Pendergrass suggested the possibility that the miliary shadows are due to calcium metastasis in the lung, and Doctor Martin reported a case in which they were interpreted as calcified areas due to healed trichinosis.

Baldwin, Petroff, and Gardner (6) make the following statement in regard to "chronic miliary tuberculosis":

> As previously mentioned, tubercle bacilli must frequently be carried from the tracheo-bronchial or other lymph nodes, such as the mesenteric or cervical groups, to the great veins of the neck by the efferent lymphatic of these nodes, which discharge directly into the thoracic duct. Such a discharge is in the nature of an overflow; it is intermittent in character, and the number of bacilli is neces-

sarily small. They will be distributed by the venous blood to the capillaries of the lung where most of them are retained and may originate fresh, isolated foci of disease.

* * * Owing to the relative immunity of the tissues the small doses of bacilli originally disseminated do not immediately initiate progressive disease. Perhaps it may never occur, but as the result of trauma, intercurrent infection, or increased functional activity in a part, the small latent tubercle becomes inflamed and serves as a local source for more or less rapid extension by contiguity and by way of the organ duct system.

Although the Röntgen findings in the Picher cases are similar to those in miliary tuberculosis, the spots in these cases appear more uniform in shape and size, and are dense and shotlike in appearance. Assuming that the disease is miliary tuberculosis, the data indicate that the disease is far more common than thought to be at present, and that it may exist for years before appearance, symptoms, or physical signs develop sufficiently to make certain a clinical diagnosis. The data reveal relatively few cases with sufficient symptoms to cause the men to seek medical advice or to render them unfit to perform their usual work. Although the large number found in 18,000 men examined indicates that the disease is quite prevalent, the fact that no deaths from the disease have occurred in the group under observation for a period of from a few weeks to three years indicates that the death rate is low. If the disease is miliary tuberculosis, the data lead to the conclusion that an unfavorable prognosis in miliary tuberculosis should be made with caution.

Pneumonoconiosis.—The lead and zinc ores in this district occur in a hard flintlike rock, containing a high percentage of silica. The mining of these ores in some instances exposes the men to fine silica dust. The inhalation of this fine dust produces first degree silicosis in from 3 to 14 years, depending upon the occupation and atmospheric dustiness. The first few cases of the group under discussion were found in miners and, at first, it was thought that the condition was silicosis in an atypical form. As the work of examining the men progressed, the companies required all men entering their service to have a physical examination prior to employment or shortly thereafter. Many of the cases under discussion were found in men seeking employment or who had been employed underground for only a short time at most and, apparently, mining work could not have caused the condition found. The generally healthy appearance, occurrence of few or no symptoms, and the occasional and often contradictory physical signs found in this group of cases correspond closely to the findings in silicotics. The cardinal symptom in both groups of cases is dyspnea on exertion out of proportion to the physical signs, appearance, and symptoms.

The Röntgenograms of the two groups of cases are radically different. The pictures in silicosis show more decided lineal markings.

The bronchial tree in the early stages shows along its course small mottled areas, sometimes referred to as "bronchial budding." These areas tend to coalesce into larger irregular areas of increased density as the disease progresses, so that in the third stage there may be large irregular areas of marked density, usually located in the bases or mid-section of the lungs. In the group of cases under discussion, the spots are regular, fairly uniform, shotlike in density, and do not tend to coalesce. The difference in the Röntgenograms and the fact that the disease apparently occurs most often in men not associated with the mining industry and who have not been exposed to large amounts of silica dust lead to the conclusion that the disease is not due to the inhalation of silica dust.

Calcium metastasis.—The possibility of miliary calcification should also be considered. Sutherland (8) describes 38 cases selected from about 60,000 Röntgenographic examinations of the chest made in the Mayo clinic. The majority were from rural districts. The lesions he observed in the Röntgenograms were multiple, miliary, calcified spots, varying in size from a pin point to two or three microns; they were round, discrete, and sharp in outline, were distributed through both lung fields, were seldom seen above the first interspace, and were generally more numerous toward the base. In number they varied from 8 to 10 large spots to a shower of innumerable miliary particles.

In his discussion of these cases Sutherland considers whether or not the diseases known to exist were adequate cause of the metastasis, as a majority of the patients had some lesion that theoretically could have been an important etiologic factor. However, in the cases in which there were definite lesions of bone, the lesions were of a type and duration that made sufficient solution of calcium to cause the secondary lesion improbable, in the majority of instances. The fact that the majority of the patients came from rural districts in which the calcium content of the water was known to be high, suggested a cause; but again there were large numbers from the same district with similar lesions who did not show any evidence of calcium metastasis. He thinks there is little doubt that many of these primary lesions and to some extent the habitat are factors in the oversaturation of the blood with calcium salts; but to this must be added some metabolic anomaly causing a disbalance that favors the precipitation of the calcium salts from the blood. Sutherland questions whether the term "metastasis" is appropriate in cases in which there is no evidence that the calcium has been absorbed from other tissues.

In his discussion of differential diagnosis Sutherland states that calcifications of the pleura are commonly confined to one portion and the lesions manifested by fibrosis; that calcification in the region of the hilum, which is often encountered, is seldom discrete; that pneumonoconiosis in the diffuse form gives a much softer and more indistinct shadow than miliary calcification, with a tendency, as the con-

dition advances, to the formation of conglomerate shadows, usually in the middle third of the lung field and toward the periphery; and that tuberculosis generally has associated evidence of a lesion of the lung tissue, with areas of irregularly shaped calcifications varying greatly in size. He states that clinically there is no syndrome indicative of the anomaly and that we are dependent on the Röntgen ray for its discovery. He also mentions the rarity of the abnormality and its usual lack of symptoms or grave consequences.

From the above description by Sutherland the disease found at Picher is apparently the same. Sutherland was unable to come to a definite conclusion as to the exact etiology.

Pneumomycosis.—The disease may be a pneumomycosis. The data show that the condition under discussion is more common in farming than in other industries in the section of the country considered. All subjects except one were farmers, teamsters, feedmill workers, or residents of small agricultural towns where grain is marketed. Farmers are exposed to fungi in threshing wheat, baling hay, or handling various small grains. Cultures were made of the dust around one wheat thresher and abundant growths were obtained on each dish exposed. Four dishes were exposed in the separator, four in the wheat stacks, and two in the wagon hauling the grain. Each plate showed a growth of a fungus closely resembling the fungi isolated from the sputum of men with the disease. Apparently all the men working in the harvest fields do not contract the disease, since a large number of men examined who had had many years of experience around the harvest fields showed no evidence of it. It is well known that fungi may be found in the mouths of healthy people.

In an article on mold infections of the lung, Emerson (7) called attention to the value of making a complete examination of the sputum, as he thought that mold infections of the lungs, treated as tuberculosis, were by no means rare. In his summary of the literature, he stated that Bennet, in 1842, reported probably the first human case, and in 1856 Virchow demonstrated at the autopsy table the pulmonary lesion and the organism. Doctor Emerson stated that the endemic form is a primary infection due to the occupation of the patient. The earlier cases reported were of pigeon feeders; men who filled their mouths with grain, from which location the young pigeons would pick their food, and of hair combers, who used rye flour in cleaning the hair and worked in an atmosphere so full of infectious dust that a cat was the only animal that could survive in company with them.

According to Doctor Emerson, *Aspergillus fumigatus* may cause necrosis, inflammation, or suppuration, but in the last mentioned lesion very little liquid pus is formed. He divides cases of mold infection of the lungs into three groups: Simple bronchitis, chronic

interstitial pneumonia, and pseudotuberculosis with cavity formation. Patients with this chronic bronchitis may suffer for years and yet have little disturbance of general health. In one case reported by Osler the patient had for 12 years expectorated, at intervals of every few weeks, masses the shape and size of a bean which consisted entirely of the mould growth. Other cases of primary chronic membranous bronchitis, expectorated casts of the larger bronchi as long as 6 centimeters. In the second group the chronic bronchitis terminates in a chronic interstitial pneumonia. The symptoms are those of severe chronic diffuse bronchitis with harassing cough and considerable dyspnea, due to emphysema and pulmonary consolidation and the resulting contraction of the chest. The third group is that of cases of pseudotuberculosis, in which the symptoms and lesions resemble those of tuberculosis—pulmonary hemorrhage, digestive disturbances, fever, night sweats, emaciation, and death. The cavities may be the size of an apple.

The investigation at Picher, as well as the search of literature, has failed to reveal sufficient knowledge of this malady to warrant a statement that it is one of the four diseases mentioned, but the evidence is sufficient to conclude that the disease is more prevalent than it has been thought to be, and for this reason it is worthy of serious study.

SUMMARY

1. About 125 cases of typical miliary lung disease are described as having been found by X-ray examination among 18,285 individuals during routine physical examination.

2. A majority of the cases did not have sufficient symptoms to cause them to stop work or to seek medical aid.

3. The most characteristic finding was a large number of discrete, dense, shot-like spots scattered over the lung areas.

4. Tubercle bacilli were present in only two of the 88 cases in which an examination was made of the sputum.

5. Unstained smears of 31 cases (all those examined) were positive for fungus.

6. Two types of fungi were identified—*Aspergillus fumigatus fisheri* and *Aspergillus niger*. Ten cases tested with antigen of *Aspergillus fumigatus fisheri* gave negative reaction; six cases tested with *Aspergillus niger* all gave positive reaction.

7. Thirty-eight cases reported by Sutherland as "miliary calcification of the lungs" are probably the same condition as found at Picher.

8. These miliary calcifications may be due primarily to fungous infection.

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DEATHS DURING WEEK ENDED NOVEMBER 15, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended November 15, 1930, and corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

	Week ended Nov. 15, 1930	Corresponding week, 1929
Policies in force	75, 288, 546	75, 088, 467
Number of death claims	13, 480	12, 992
Death claims per 1,000 policies in force, annual rate	9. 3	9. 0

Deaths[1] from all causes in certain large cities of the United States during the week ended November 15, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Nov. 15, 1930				Corresponding week 1929		Death rate[2] for first 46 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1930	1929
Total (78 cities)	8,037	12.1	747	[4] 60	11.3	657	11.9	12.7
Akron	30	6.2	5	46	10.3	7	7.9	9.4
Albany[5]	38	15.5	6	124	15.7	2	14.8	16.4
Atlanta	49	9.5	5	51	12.5	8	15.7	16.0
White	31		4	63		4		
Colored	18	(6)	1	29	(6)	4	(6)	(6)
Baltimore[5]	244	15.8	23	80	13.3	14	14.1	14.6
White	196		14	62		11		
Colored	48	(6)	9	144	(6)	3	(6)	(6)
Birmingham	78	15.7	11	106	13.2	5	13.8	16.0
White	35		5	79		2		
Colored	43	(6)	6	147	(6)	3	(6)	(6)
Boston	214	14.2	26	75	13.0	29	14.1	15.0
Bridgeport	25	8.9	1	17	10.6	4	10.9	12.0
Buffalo	143	13.0	13	58	12.8	11	12.9	14.1
Cambridge	26	11.9	2	40	10.6	0	11.8	12.5
Camden	30	13.3	1	18	13.8	4	13.7	14.5
Canton	12	5.9	5	133	7.0	1	9.9	11.2
Chicago[5]	731	11.2	70	62	10.3	55	10.4	11.3
Cincinnati	166	19.2	11	65	13.7	6	15.7	17.0
Cleveland	168	9.7	15	45	9.4	18	11.0	12.4
Columbus	90	16.2	6	59	11.7	7	15.6	14.8
Dallas	65	12.9	8		10.3	8	11.5	11.4
White	54		6			8		
Colored	11	(6)	2		(6)	0	(6)	(6)
Dayton	50	12.9	7	105	10.6	3	10.8	11.5
Denver	96	17.4	14	153	13.0	3	14.9	14.8
Des Moines	29	10.6	1	18	11.1	2	11.7	11.5
Detroit	292	9.6	30	46	9.2	37	9.3	11.1
Duluth	25	12.9	2	54	10.8	3	11.5	11.5
El Paso	22	11.2	4		19.2	7	17.1	19.6
Erie	16	7.2	1	22	11.3	4	11.1	12.1
Fall River[5 7]	24	10.9	0	0	13.2	3	11.8	13.6
Flint	21	6.9	6	71	8.6	2	9.2	10.7
Fort Worth	27	8.7	2		17.0	4	11.0	12.3
White	22		1			4		
Colored	5	(6)	1		(6)	0	(6)	(6)
Grand Rapids	32	9.9	2	30	15.0	5	10.2	10.3
Houston	83	14.8	7		10.0	4	12.2	12.6
White	48		5			4		
Colored	35	(6)	2		(6)	0	(6)	(6)
Indianapolis	95	13.6	9	68	14.6	3	14.5	14.7
White	80		5	43		2		
Colored	15	(6)	4	233	(6)	1	(6)	(6)
Jersey City	83	13.7	6	52	9.6	6	11.4	12.5
Kansas City, Kans.	30	12.8	4	93	9.0	4	11.7	12.9
White	18		3	83		4		
Colored	12	(6)	1	152	(6)	0	(6)	(6)
Kansas City, Mo.	97	12.8	9	75	11.6	6	13.5	13.9
Knoxville	40	19.6	3	70	12.6	6	13.6	14.0
White	31		3	78		5		
Colored	9	(6)	0	0	(6)	1	(6)	(6)
Los Angeles	267	11.2	23	70	10.9	10	11.1	11.3
Louisville	86	14.0	9	77	11.2	4	13.6	15.2
White	65		9	80		3		
Colored	21	(6)	0	0	(6)	1	(6)	(6)
Lowell[7]	28	14.6	3	79	16.5	3	13.5	14.1
Lynn	24	12.2	1	28	7.7	0	10.4	11.2
Memphis	90	18.6	9	106	16.3	3	17.1	18.9
White	46		4	72		2		
Colored	44	(6)	5	168	(6)	1	(6)	(6)
Milwaukee	85	7.8	7	31	8.5	14	9.8	11.0
Minneapolis	88	9.9	18	118	12.1	7	10.7	10.8

See footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended November 15, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929*—Continued

City	Week ended Nov. 15, 1930				Corresponding week 1929		Death rate [2] for first 46 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Nashville	37	13.1	4	63	15.6	6	17.3	18.7
White	24		3	63		5		
Colored	13	(6)	1	62	(6)	1	(6)	(6)
New Bedford [7]	23	10.6	3	77	11.5	1	10.9	12.1
New Haven	46	14.7	3	46	9.9	1	12.8	13.5
New Orleans	159	18.1	14	78	15.5	13	17.5	17.6
White	93		6	51		9		
Colored	66	(6)	8	130	(6)	4	(6)	(6)
New York	1,422	10.6	118	50	10.1	106	10.7	11.3
Bronx Borough	185	7.5	7	20	6.7	14	7.9	8.2
Brooklyn Borough	482	9.6	48	50	9.6	47	9.7	10.2
Manhattan Borough	562	15.8	47	60	14.7	32	16.1	16.4
Queens Borough	161	7.7	14	56	6.9	10	7.1	7.6
Richmond Borough	32	10.5	2	39	12.8	3	14.1	15.9
Newark, N. J	125	14.7	18	94	10.6	7	12.0	12.7
Oakland	53	9.7	3	37	8.4	2	10.9	11.2
Oklahoma City	36	10.1	5	90	13.9	4	10.8	10.8
Omaha	54	13.1	5	61	11.8	4	13.5	13.5
Paterson	21	7.9	4	70	6.4	2	12.1	13.2
Philadelphia	495	13.1	48	71	11.5	39	12.5	13.1
Pittsburgh	189	14.7	13	46	13.2	14	13.8	14.8
Portland, Oreg	82	14.2	2	25	12.5	5	12.3	12.8
Providence	66	13.7	4	37	12.9	6	13.0	14.5
Richmond	58	16.5	4	58	18.9	5	14.9	16.4
White	36		3	66		3		
Colored	22	(6)	1	43	(6)	2	(6)	(6)
Rochester	94	15.0	10	89	10.7	7	11.8	12.3
St. Louis	183	11.6	13	45	14.3	20	14.1	14.6
St. Paul	58	11.1	5	51	8.7	4	10.1	10.4
Salt Lake City [5]	47	17.4	9	143	13.2	1	12.5	13.0
San Antonio	50	10.2	6		10.3	3	14.5	14.4
San Diego	37	12.9	1	21	13.1	6	14.3	15.1
San Francisco	128	10.6	2	14	12.9	4	13.1	13.0
Schenectady	23	12.5	4	123	12.0	1	11.2	12.2
Seattle	82	11.7	4	40	12.3	6	10.9	11.2
Somerville	26	13.1	3	95	8.1	2	9.8	9.2
Spokane	26	11.7	2	52	13.1	2	12.5	12.7
Springfield, Mass	37	12.8	2	34	8.4	4	12.1	12.6
Syracuse	40	10.0	5	62	7.9	5	11.7	12.9
Tacoma	32	15.6	1	27	10.8	3	12.6	11.8
Toledo	84	15.0	11	101	13.9	11	12.7	13.7
Trenton	27	11.5	6	115	19.6	6	16.6	17.1
Utica	25	12.7	0	0	12.2	1	14.7	15.5
Washington, D. C	160	17.1	11	64	13.6	14	15.2	15.4
White	102		5	44		6		
Colored	58	(6)	6	107	(6)	8	(6)	(6)
Waterbury	17	8.7	1	24	7.8	1	9.3	9.5
Wilmington, Del.[7]	41	20.4	5	121	13.9	1	14.6	13.9
Worcester	54	14.3	6	83	8.5	3	12.6	12.6
Yonkers	16	6.1	3	71	10.2	2	8.0	9.3
Youngstown	45	13.8	4	57	7.5	4	10.3	12.2

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended November 22, 1930, and November 23, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 22, 1930, and November 23, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929
New England States:								
Maine	5	4		2	20	1	0	2
New Hampshire	7	9				19	0	0
Vermont	2	3			1	7	0	0
Massachusetts	74	112	6	5	161	110	1	4
Rhode Island	12	22	1	5	1	1	0	0
Connecticut	21	20	3	2	91	4	2	0
Middle Atlantic States:								
New York	93	202	[1] 14	[1] 12	192	154	5	21
New Jersey	65	148	12	9	130	36	4	6
Pennsylvania	152	284			268	455	3	10
East North Central States:								
Ohio	49	66	3	10	15	265	2	5
Indiana	61	37	11		121	13	0	2
Illinois	190	239	9	48	146	270	4	9
Michigan	188	34	5	3	44	146	8	19
Wisconsin	27	19	36	16	182	458	0	3
West North Central States:								
Minnesota	24	29			10	96	2	0
Iowa	19	17			4	83	0	0
Missouri	61	66	8	17	393	39	6	7
North Dakota	2	5			3	9	1	0
South Dakota	6	2			1	3	0	0
Nebraska	9	30	8	4	12	39	3	1
Kansas	15	30	1		7	66	3	3
South Atlantic States:								
Delaware	5	4			1		0	0
Maryland [2]	35	34	17	10	12	13	0	1
District of Columbia	15	10	3	1	6	2	1	2
Virginia								1
West Virginia	25	47	23	19	18	18	0	4
North Carolina	101	148	10	14	12	9	2	2
South Carolina	47	41	550	689			5	0
Georgia	15	13	72	61	10		1	0
Florida	27	14	2	3	18	3	0	0
East South Central States:								
Kentucky	22	26					1	2
Tennessee	72	33	11	58	21	9	4	5
Alabama	87	87	55	25	53	10	4	1
Mississippi	64	61					2	0
West South Central States:								
Arkansas	18	12	32	22		3	1	0
Louisiana	46	46	12	6	2	4	4	1
Oklahoma [3]	69	113	47	84	38	8	1	3
Texas	67	123	12	132	26	4	0	1

[1] New York City only.
[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 22, 1930, and November 23, 1929*—Continued**

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929
Mountain States:								
Montana	7				1	52	0	2
Idaho					6	88	1	0
Wyoming		2				2	0	0
Colorado	20	11		1	48	5	2	2
New Mexico	6	8			16		2	2
Arizona	4	14		2	34	1	1	3
Utah [2]	2	2	7			9	3	2
Pacific States:								
Washington	32	9		2	33	18	0	1
Oregon	5	17	13	35	57	16	0	3
California	66	97	31	38	117	134	5	9

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929
New England States:								
Maine	3	0	17	27	0	0	17	5
New Hampshire	0	0	4	17	0	0	0	1
Vermont	0	0	13	17	1	5	0	0
Massachusetts	9	6	172	188	0	0	11	3
Rhode Island	0	0	6	21	0	0	3	0
Connecticut	1	0	38	45	0	0	4	7
Middle Atlantic States:								
New York	11	8	409	289	25	34	33	31
New Jersey	0	1	144	148	0	0	8	6
Pennsylvania	5	5	520	414	1	0	40	26
East North Central States:								
Ohio	18	8	351	206	55	112	38	14
Indiana	2	0	204	101	73	163	4	2
Illinois	6	0	326	491	36	172	32	15
Michigan	4	3	210	213	41	79	15	4
Wisconsin	5	0	172	88	9	24	5	9
West North Central States:								
Minnesota	8	0	75	119	8	4	7	5
Iowa	14	2	50	57	13	63	5	40
Missouri	9	0	88	122	12	19	21	4
North Dakota	1	0	17	16	5	7	1	0
South Dakota	4	0	10	5	6	24	2	0
Nebraska	15	0	33	37	12	55	1	1
Kansas	10	0	47	61	24	41	7	5
South Atlantic States:								
Delaware	0	0	13	2	0	0	4	0
Maryland [2]	3	1	82	84	0	0	30	13
District of Columbia	0	0	37	13	0	0	1	2
Virginia		3						
West Virginia	2	2	63	77	32	27	28	12
North Carolina	0	2	120	107	0	4	6	8
South Carolina	2	3	23	35	1	2	24	12
Georgia	0	1	35	36	0	0	18	6
Florida	0	0	7	6	1	1	1	1
East South Central States:								
Kentucky	1	0	71	51	0	10	16	4
Tennessee	0	0	53	45	2	28	15	13
Alabama	2	0	112	44	0	3	8	14
Mississippi	0	0	39	27	0	0	18	12
West South Central States:								
Arkansas	2	0	30	35	3	10	25	12
Louisiana	3	0	15	20	5	2	25	12
Oklahoma [3]	2	2	65	84	5	12	19	26
Texas	7	0	41	34	3	15	32	10

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 22, 1930, and November 23, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929	Week ended Nov. 22, 1930	Week ended Nov. 23, 1929
Mountain States:								
Montana	0	1	22	28	6	11	1	4
Idaho	0	0	4	13	0	2	1	0
Wyoming	4	0	9	4	0	10	0	0
Colorado	1	1	27	18	7	18	19	9
New Mexico	3	0	3	11	0	0	5	5
Arizona	1	0	5	5	0	1	0	3
Utah [1]	0	0	5	15	0	0	1	0
Pacific States:								
Washington	1	1	44	65	30	74	5	9
Oregon	1	1	18	28	15	11	8	3
California	24	3	94	270	18	52	10	10

[1] Week ended Friday.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September, 1930										
Hawaii Territory	3	19	14		5		2	5	0	21
October, 1930										
Alabama	8	261	73	579	97	30	10	233	0	106
Idaho	1	2			31		5	26	2	13
Illinois	25	579	72	25	118		101	807	84	146
Louisiana	5	85	18	53	7	33	12	51	1	81
Maine	1	10	15		13		55	64	0	27
Maryland	1	139	31	1	13	3	14	182	0	174
Massachusetts	8	302	11	2	339	1	170	436	0	34
Minnesota	5	73	1		32		103	143	32	20
Missouri	15	185	5	14	213		90	205	43	120
New Mexico	4	37	2	48	29	3	4	28	1	75
North Carolina	6	810	39		20	240	1	569	4	88
Pennsylvania	21	483			396	3	46	994	4	271
Rhode Island	1	61			1		6	39		19
Vermont		7			10		9	31	1	3
West Virginia	1	123	58		85		18	200	18	176

September, 1930

Hawaii Territory:	Cases
Chicken pox	5
Conjunctivitis, follicular	23
Impetigo contagiosa	53
Leprosy	6
Mumps	9
Tetanus	2
Trachoma	2
Whooping cough	4

October, 1930

Actinomycosis:	Cases
Illinois	1
Massachusetts	1
Anthrax:	
Louisiana	1
Maryland	1
Chicken pox:	
Alabama	7
Idaho	25

Chicken pox—Continued.	Cases
Illinois	911
Louisiana	7
Maine	80
Maryland	93
Massachusetts	486
Minnesota	365
Missouri	91
New Mexico	38
North Carolina	129
Pennsylvania	958
Rhode Island	41
Vermont	95
West Virginia	31
Conjunctivitis:	
New Mexico	2
Dengue:	
Alabama	1
Diarrhea:	
Maryland	54
Dysentery:	
Illinois	61
Illinois (amebic)	3
Illinois (bacillary)	5
Louisiana	10
Maryland	41
Massachusetts	2
Minnesota	11
Minnesota (amebic)	4
German measles:	
Illinois	15
Maine	3
Maryland	6
Massachusetts	41
North Carolina	15
Pennsylvania	30
Rhode Island	1
Hookworm disease:	
Louisiana	43
Impetigo contagiosa:	
Maryland	22
Lead poisoning:	
Illinois	3
Massachusetts	2
Leprosy:	
Louisiana	2
Maryland	1
Lethargic encephalitis:	
Illinois	15
Louisiana	4
Maine	2
Massachusetts	1
Minnesota	2
Pennsylvania	4
Mumps:	
Alabama	14
Idaho	4
Illinois	424
Louisiana	3
Maine	79
Maryland	18
Massachusetts	99
Missouri	19
New Mexico	9
Pennsylvania	324
Rhode Island	10
Vermont	4

Ophthalmia neonatorum:	Cases
Illinois	42
Maryland	2
Massachusetts	88
Missouri	2
North Carolina	2
Pennsylvania	14
Rhode Island	2
Paratyphoid fever:	
Idaho	2
Illinois	2
Louisiana	1
Maine	1
Puerperal septicemia:	
Illinois	4
Pennsylvania	23
Rabies in animals:	
Illinois	2
Louisiana	9
Maryland	5
Missouri	3
Rhode Island	1
Rabies in man:	
Massachusetts	1
Pennsylvania	1
Scabies:	
Maryland	2
Septic sore throat:	
Illinois	10
Louisiana	2
Maryland	6
Massachusetts	6
Missouri	28
North Carolina	19
Tetanus:	
Illinois	19
Louisiana	3
Maryland	4
Missouri	1
Pennsylvania	6
Trachoma:	
Illinois	10
Massachusetts	3
Missouri	108
Pennsylvania	4
Trichinosis:	
Massachusetts	1
Tularaemia:	
Idaho	2
Louisiana	1
Missouri	1
Typhus fever:	
Alabama	10
Maryland	2
North Carolina	1
Undulant fever:	
Alabama	2
Idaho	2
Illinois	4
Louisiana	2
Minnesota	8
Missouri	6
Pennsylvania	3
Vermont	2
Vincent's angina:	
Idaho	1
Illinois	1

Vincent's angina—Continued.	Cases
Maine	6
Maryland	3
Rhode Island	1
Whooping cough:	
Alabama	56
Idaho	21
Illinois	548
Louisiana	25
Maine	220
Maryland	141

Whooping cough—Continued.	Cases
Massachusetts	304
Minnesota	85
Missouri	71
New Mexico	9
North Carolina	238
Pennsylvania	538
Rhode Island	39
Vermont	140
West Virginia	73

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of October, 1930, by departments of health of certain States to other State health departments

Disease	California	Connecticut	Illinois	Kansas	Massachusetts	Minnesota	New York	Oregon	South Dakota
Dysentery [1]						1			
Gonorrhea					1	2			
Malaria							1		
Meningitis [2]		1							
Poliomyelitis		4				4	1		13
Syphilis				[3] 11		2			
Tuberculosis	1		8			55		1	
Tularaemia						1			
Typhoid fever		1	2		4	4	4		
Undulant fever						1	5		

[1] Bacillary. [2] Meningococcus. [3] Four cases in United States Penitentiary included.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,165,000. The estimated population of the 91 cities reporting deaths is more than 30,570,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended November 15, 1930, and November 16, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
45 States	1,733	2,546	
98 cities	563	966	1,150
Measles:			
45 States	1,773	1,994	
98 cities	573	341	
Meningococcus meningitis:			
46 States	96	125	
98 cities	34	63	
Poliomyelitis:			
46 States	268	63	
Scarlet fever:			
46 States	3,670	3,699	
98 cities	1,179	1,247	978
Smallpox:			
45 States	355	906	
98 cities	25	82	18
Typhoid fever:			
46 States	575	362	
98 cities	95	47	61
Deaths reported			
Influenza and pneumonia:			
91 cities	747	618	
Smallpox:			
91 cities	0	0	

City reports for week ended November 15, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include serveral epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepedemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and City	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	2	1	0		0	1	0	3
New Hampshire:								
Concord	0	0	0		0	0	0	0
Nashua	0	0	4		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	0	0		0	0	0	0
Massachusetts:								
Boston	49	32	24		1	31	3	27
Fall River	11	4	1		1	0	0	0
Springfield	15	5	2		0	1	0	1
Worcester	15	5	1		0	0	0	2
Rhode Island:								
Pawtucket	4	1	2		0	0	0	1
Providence	9	10	2		0	0	0	2
Connecticut:								
Bridgeport	3	6	0		0	0	0	3
Hartford	3	5	2		0	27	0	3
New Haven	5	1	0		0	11	6	5
MIDDLE ATLANTIC								
New York:								
Buffalo	31	17	7		0	31	16	26
New York	144	161	52	25	14	57	28	140
Rochester	10	5	1		0	1	1	8
Syracuse	22	3	0		0	1	0	2
New Jersey:								
Camden	4	8	3		0	20	9	1
Newark	12	17	11	1	0	6	6	14
Trenton	1	4	0		0	0	0	7
Pennsylvania:								
Philadelphia	97	70	18	2	4	29	19	53
Pittsburgh	27	27	4		0	4	4	33
Reading	17	3	0		0	0	8	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	1	13	1		1	0	10	12
Cleveland	142	53	12	3	2	3	66	10
Columbus	16	10	10	2	4	0	0	7
Toledo	61	11	3	2	2	3	4	3
Indiana:								
Fort Wayne	4	5	2		1	2	0	0
Indianapolis	40	13	13		0	1	2	12
South Bend	4	2	4		0	1	0	1
Terre Haute	0	2	0		0	0	0	2
Illinois:								
Chicago	103	146	104	3	4	9	49	58
Springfield	0	2	5		1	0	0	1
Michigan:								
Detroit	133	67	49	5	1	5	24	25
Flint	18	6	0		0	2	0	2
Grand Rapids	3	3	0		0	1	0	0
Wisconsin:								
Kenosha	41	2	1		0	0	4	1
Madison	33	2	0			0	23	
Milwaukee	78	22	6		0	3	38	6
Racine	22	2	0		0	0	0	0
Superior	5	0	0		0	0	0	0

City reports for week ended November 15, 1930—Continued

Division, State, and City	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL								
Minnesota:								
Duluth	18	0	0	----------	0	0	0	4
Minneapolis	44	34	8	----------	2	6	8	0
St. Paul	49	15	1	----------	0	2	1	8
Iowa:								
Davenport	0	1	2	----------	----------	0	0	----------
Des Moines	3	3	1	----------	----------	2	0	----------
Sioux City	12	2	1	----------	----------	1	1	----------
Waterloo	20	1	0	----------	----------	1	0	----------
Missouri:								
Kansas City	21	11	13	----------	0	1	3	6
St. Joseph	1	2	0	----------	0	0	0	1
St. Louis	22	46	21	----------	----------	245	4	----------
North Dakota:								
Fargo	8	0	0	----------	0	0	9	1
Grand Forks	2	0	0	----------	----------	0	10	----------
South Dakota:								
Aberdeen	2	0	0	----------	----------	0	1	----------
Sioux Falls	0	1	0	----------	----------	0	0	----------
Nebraska:								
Omaha	11	12	6	----------	0	1	0	0
Kansas:								
Topeka	1	2	1	----------	0	1	0	0
Wichita	9	4	4	----------	0	1	0	6
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	2	----------	0	0	0	6
Maryland:								
Baltimore	48	29	5	8	0	1	4	27
Cumberland	0	0	0	----------	0	0	0	1
Frederick	1	0	1	----------	0	0	0	0
District of Columbia:								
Washington	8	21	6	1	1	4	0	16
Virginia:								
Lynchburg	2	4	3	----------	0	0	0	3
Norfolk	1	3	1	----------	0	0	0	12
Richmond	1	18	9	----------	0	4	1	3
Roanoke	3	5	3	----------	0	0	0	0
West Virginia:								
Charleston	6	3	1	1	1	0	1	3
Wheeling	20	2	0	1	0	1	1	3
North Carolina:								
Raleigh	0	3	1	----------	0	0	0	1
Wilmington	0	1	2	----------	0	0	0	3
Winston-Salem	10	5	1	----------	0	0	1	1
South Carolina:								
Charleston	0	2	0	45	0	0	0	4
Columbia	3	1	2	----------	0	0	1	0
Greenville	2	1	0	----------	0	1	0	0
Georgia:								
Atlanta	5	8	21	21	1	2	0	5
Brunswick	0	0	0	----------	0	0	0	3
Savannah	0	3	3	3	0	0	0	4
Florida:								
Miami	0	2	0	----------	0	1	0	1
St. Petersburg	----------	0	----------	----------	0	----------	----------	0
Tampa	0	2	0	----------	0	1	0	3
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	2	0	----------	0	0	0	2
Tennessee:								
Memphis	20	9	8	----------	1	0	13	9
Nashville	0	4	4	----------	2	0	1	3
Alabama:								
Birmingham	1	8	13	1	1	3	0	13
Mobile	1	2	3	----------	2	0	0	2
Montgomery	0	3	3	----------	----------	0	0	----------

City reports for week ended November 15, 1930—Continued

Division, State, and City	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	3	0	----------	----------	0	0	----------
Little Rock	2	4	0	----------	0	0	0	1
Louisiana:								
New Orleans	0	14	8	3	4	0	0	16
Shreveport	1	3	0	----------	1	0	0	0
Oklahoma:								
Muskogee	0	3	4	----------	0	2	0	0
Texas:								
Dallas	5	19	15	----------	2	0	1	8
Fort Worth	12	8	9	----------	1	0	0	4
Galveston	0	1	1	----------	0	0	0	1
Houston	0	9	20	----------	1	0	0	3
San Antonio	0	5	2	----------	0	0	0	0
MOUNTAIN								
Montana:								
Billings	6	1	0	----------	1	0	0	0
Great Falls	4	0	0	----------	0	0	0	2
Helena	3	0	0	----------	0	0	0	0
Missoula	0	1	0	----------	0	0	0	1
Idaho:								
Boise	2	0	0	----------	0	0	0	0
Colorado:								
Denver	40	13	2	----------	0	2	7	16
Pueblo	1	1	0	----------	0	33	0	0
New Mexico:								
Albuquerque	8	0	0	----------	0	0	0	0
Arizona:								
Phoenix	0	1	0	----------	0	0	0	5
Utah:								
Salt Lake City	10	5	1	----------	0	0	1	6
Nevada:								
Reno	0	0	0	----------	0	0	0	0
PACIFIC								
Washington:								
Seattle	22	5	0	----------	----------	0	18	----------
Spokane	7	3	0	----------	----------	1	0	----------
Tacoma	0	4	5	----------	0	0	0	4
Oregon:								
Portland	26	11	0	----------	0	1	5	9
Salem	0	0	0	----------	0	0	0	0
California:								
Los Angeles	14	41	15	17	1	14	13	13
Sacramento	5	3	1	1	0	0	14	4
San Francisco	9	17	10	2	1	1	7	6

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	2	1	0	0	--------	0	1	2	0	11	23
New Hampshire:											
Concord	0	0	0	0	--------	0	0	0	0	0	9
Nashua	1	1	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	--------	0	0	0	0	0	3
Burlington	0	0	0	0	0	0	0	0	0	0	7
Massachusetts:											
Boston	53	42	0	0	0	14	2	4	0	8	214
Fall River	4	6	0	0	0	2	0	0	0	0	24
Springfield	5	8	0	0	0	1	0	0	0	1	30
Worcester	9	30	0	0	0	0	0	2	0	2	54

City reports for week ended November 15, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND—continued											
Rhode Island:											
Pawtucket	0	6	0	0	0	0	0	0	0	0	15
Providence	9	10	0	0	0	2	0	0	1	16	66
Connecticut:											
Bridgeport	7	5	0	0	0	1	0	2	0	0	25
Hartford	4	4	0	0	0	0	0	0	1	1	37
New Haven	4	2	0	0	0	0	1	0	0	5	46
MIDDLE ATLANTIC											
New York:											
Buffalo	22	14	0	1	0	9	1	0	0	18	135
New York	98	74	0	0	0	94	16	4	3	134	1,422
Rochester	5	25	0	0	0	6	0	0	0	11	87
Syracuse	6	9	0	0	0	3	0	0	0	10	40
New Jersey:											
Camden	3	2	0	0	0	0	1	0	0	1	30
Newark	12	10	0	0	0	9	1	0	0	13	130
Trenton	3	10	0	0	0	0	0	1	0	1	27
Pennsylvania:											
Philadelphia	64	105	0	0	0	32	5	4	1	10	495
Pittsburgh	34	28	0	0	0	12	0	0	0	4	189
Reading	2	1	0	0	0	2	0	0	0	0	20
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	13	28	0	0	0	9	1	0	0	0	166
Cleveland	28	57	0	0	0	9	1	3	0	10	168
Columbus	9	9	1	0	0	1	0	0	0	3	90
Toledo	11	14	0	0	0	2	1	0	0	1	84
Indiana:											
Fort Wayne	3	0	1	1	0	0	0	1	0	0	23
Indianapolis	13	46	2	1	0	3	0	0	0	1	--------
South Bend	3	2	0	0	0	1	0	0	0	0	15
Terre Haute	4	1	0	0	0	2	0	0	0	0	23
Illinois:											
Chicago	97	199	0	0	0	48	3	2	0	50	731
Springfield	3	9	0	0	0	1	0	1	0	0	28
Michigan:											
Detroit	73	58	1	0	0	21	2	0	0	43	292
Flint	13	25	0	0	0	0	0	0	0	4	21
Grand Rapids	9	15	0	1	0	0	0	0	0	2	32
Wisconsin:											
Kenosha	1	3	0	0	0	1	0	1	0	0	11
Madison	1	4	0	0	--------	--------	0	0	--------	5	--------
Milwaukee	17	6	0	0	0	1	0	0	0	36	85
Racine	4	3	0	0	0	0	0	0	0	2	20
Superior	3	2	0	0	0	0	0	0	0	1	9
WEST NORTH CENTRAL											
Minnesota:											
Duluth	9	0	0	0	0	0	0	0	0	6	25
Minneapolis	43	8	1	0	0	2	0	3	1	8	--------
St. Paul	19	3	0	0	0	6	0	0	1	9	59
Iowa:											
Davenport	0	0	0	1	--------	--------	0	0	--------	0	--------
Des Moines	11	6	2	5	--------	--------	0	0	--------	0	29
Sioux City	2	3	0	0	--------	--------	0	0	--------	9	--------
Waterloo	3	3	1	0	--------	--------	0	0	--------	6	--------
Missouri:											
Kansas City	14	10	0	0	0	10	1	4	0	7	97
St. Joseph	4	4	0	0	0	0	0	0	0	0	33
St. Louis	33	34	0	0	0	7	3	1	0	3	183
North Dakota:											
Fargo	2	0	0	0	0	0	0	0	0	0	6
Grand Forks	1	1	0	0	--------	--------	0	0	--------	2	--------
South Dakota:											
Aberdeen	0	0	0	0	--------	--------	0	0	--------	0	--------
Sioux Falls	2	0	0	1	--------	--------	0	0	--------	0	10

City reports for week ended November 15, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL—continued											
Nebraska:											
Omaha	5	4	1	10	0	3	0	2	0	4	54
Kansas:											
Topeka	4	3	0	0	0	0	0	0	0	0	17
Wichita	5	2	1	1	0	1	0	0	0	0	27
SOUTH ATLANTIC											
Delaware:											
Wilmington	3	2	0	0	0	2	1	0	0	0	41
Maryland:											
Baltimore	18	21	0	0	0	11	3	8	0	20	244
Cumberland	1	0	0	0	0	1	0	0	0	0	10
Frederick	1	0	0	0	0	0	0	0	0	0	2
District of Columbia:											
Washington	16	18	1	0	0	14	2	1	1	3	160
Virginia:											
Lynchburg	1	0	0	0	0	0	0	4	2	1	16
Norfolk	2	2	0	0	0	3	0	1	0	1	--------
Richmond	8	9	0	0	0	5	0	1	0	0	67
Roanoke	4	4	0	0	0	0	0	0	0	0	14
West Virginia:											
Charleston	3	1	0	0	0	4	0	1	0	1	20
Wheeling	2	2	0	0	0	0	0	0	0	0	24
North Carolina:											
Raleigh	1	0	0	0	0	1	0	0	0	0	15
Wilmington	1	3	0	0	0	0	0	0	1	1	18
Winston-Salem	5	1	1	0	0	1	0	0	0	2	14
South Carolina:											
Charleston	1	1	0	0	0	3	0	1	0	2	30
Columbia	1	5	0	0	0	0	0	0	0	0	2
Greenville	1	0	0	0	0	0	0	0	0	0	--------
Georgia:											
Atlanta	7	9	0	0	0	1	1	1	0	2	49
Brunswick	0	0	0	0	0	0	0	0	0	0	5
Savannah	1	0	0	0	0	3	0	0	0	0	38
Florida:											
Miami	0	1	0	0	0	2	0	0	0	1	28
St. Petersburg	0	--------	0	--------	0	0	0	--------	0	--------	10
Tampa	0	1	0	0	0	0	0	0	0	0	17
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	10	0	0	0	0	0	0	0	0	17
Tennessee:											
Memphis	6	12	0	0	0	5	1	5	2	1	90
Nashville	3	12	0	0	0	2	1	2	0	0	37
Alabama:											
Birmingham	4	10	0	0	0	2	1	0	0	0	78
Mobile	1	1	0	0	0	3	0	0	1	0	32
Montgomery	0	1	0	0	--------	--------	0	1	--------	1	--------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	1	0	0	--------	--------	0	0	--------	1	--------
Little Rock	3	0	0	0	0	3	0	1	0	0	--------
Louisiana:											
New Orleans	8	14	0	0	0	7	2	3	1	2	159
Shreveport	2	2	0	1	0	1	1	1	0	2	32
Oklahoma:											
Muskogee	2	0	1	0	0	0	0	0	0	1	--------
Texas:											
Dallas	7	12	0	0	0	2	1	3	3	3	65
Fort Worth	2	5	0	0	0	0	1	0	0	0	27
Galveston	1	1	0	0	0	0	1	17	0	0	19
Houston	3	3	0	0	0	3	0	0	0	0	83
San Antonio	1	1	1	0	0	3	0	0	0	0	50

City reports for week ended November 15, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
MOUNTAIN											
Montana:											
Billings	1	0	0	0	0	0	0	0	0	1	9
Great Falls	1	7	0	0	0	1	0	0	0	7	15
Helena	0	0	0	0	0	0	0	0	0	0	5
Missoula	0	2	0	0	0	0	0	1	0	0	7
Idaho:											
Boise	0	2	0	0	0	0	0	0	0	2	5
Colorado:											
Denver	10	• 26	0	0	0	11	1	0	0	12	96
Pueblo	1	1	0	0	0	0	0	2	0	4	10
New Mexico:											
Albuquerque	0	0	0	0	0	3	0	1	1	0	12
Arizona:											
Phoenix	2	0	0	0	0	4	0	0	0	0	-------
Utah:											
Salt Lake City	3	6	1	0	0	2	1	0	0	24	47
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	9	12	1	0	-------	-------	1	3	-------	8	-------
Spokane	9	4	2	7	-------	-------	1	0	-------	0	-------
Tacoma	4	4	1	1	0	0	0	0	0	0	32
Oregon:											
Portland	8	1	3	1	0	1	1	1	0	0	82
Salem	0	0	0	0	0	0	0	0	0	0	-------
California:											
Los Angeles	27	23	0	1	0	16	1	2	1	22	267
Sacramento	3	0	1	0	0	1	1	0	0	8	24
San Francisco	13	6	0	0	0	7	1	0	0	16	166

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	3	0
Massachusetts:									
Boston	0	0	0	0	0	0	2	6	0
Worcester	1	0	0	0	0	0	0	0	0
Connecticut:									
Hartford	0	0	0	0	0	0	0	1	0
MIDDLE ATLANTIC									
New York:									
New York	6	1	2	2	0	0	5	0	0
Rochester	0	0	0	0	0	0	0	2	0
Syracuse	0	0	0	0	0	0	0	2	0
New Jersey:									
Newark	1	1	0	0	0	0	0	1	0
Pennsylvania:									
Philadelphia	0	1	0	1	0	0	1	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	3	1	0	0	0	0	0	2	1
Cleveland	1	0	0	0	0	0	0	4	0
Columbus	1	0	0	0	0	0	0	0	0
Indiana:									
Fort Wayne	0	0	0	1	0	0	0	0	0
Indianapolis	1	0	0	0	0	0	0	1	1
South Bend	0	0	0	0	0	0	0	1	0

City reports for week ended November 15, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL—con.									
Illinois:									
Chicago	5	4	1	0	0	0	1	8	1
Springfield	1	0	0	0	0	0	0	0	0
Michigan:									
Detroit	3	0	3	0	0	0	0	1	1
Wisconsin:									
Kenosha	0	0	0	0	0	0	0	1	0
Madison	0	0	0	0	0	0	0	1	0
Milwaukee	0	0	0	0	0	0	0	4	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	1	0	0	0	0	0	2	0
Iowa:									
Des Moines	0	0	0	0	0	0	0	3	0
Sioux City	0	0	0	0	0	0	0	1	0
Missouri:									
Kansas City	1	0	0	0	0	0	0	1	0
St. Joseph	0	1	0	0	0	0	0	0	0
St. Louis	1	1	1	0	0	0	0	0	0
North Dakota:									
Fargo	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	1	1	0	0	0	1	1
District of Columbia:									
Washington	2	1	0	0	1	1	0	0	0
Virginia:									
Lynchburg	0	0	0	0	0	1	0	0	0
North Carolina:									
Raleigh	0	0	0	0	3	2	0	0	0
South Carolina:									
Charleston [1]	1	1	0	0	1	0	0	0	0
Georgia:									
Atlanta	0	0	0	0	1	1	0	0	0
Savannah	0	0	0	0	3	2	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	1	0	0	0	0	0	0	0
Nashville	1	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	1	0	0	0	0	1	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	0	0	0	1	1	1	0	0
Shreveport	0	0	0	0	0	2	0	0	0
Texas:									
Dallas [2]	0	0	0	0	2	1	0	1	0
Fort Worth	0	0	0	0	0	0	0	1	0
Houston	0	0	0	0	0	2	0	0	0
San Antonio	0	0	0	0	0	0	0	1	0
MOUNTAIN									
New Mexico:									
Albuquerque	0	1	0	0	0	0	0	0	0
Utah:									
Salt Lake City	1	0	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles	0	0	0	0	0	1	0	3	1
Sacramento	0	0	0	0	2	0	1	1	0
San Francisco	1	0	1	1	0	0	0	13	0

[1] Dengue, 2 cases at Charleston, S. C.

[2] Typhus fever, 1 case at Dallas, Tex.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended November 15, 1930, compared with those for a like period ended November 16, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities October 12 to November 15, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929
98 cities	71	135	[2] 79	134	[3] 93	143	[4] 84	156	91	159
New England	64	128	97	110	[5] 85	114	[6] 79	119	75	168
Middle Atlantic	35	88	36	86	[7] 48	99	35	104	46	112
East North Central	92	155	106	163	131	168	110	195	130	205
West North Central	74	167	65	137	91	160	[8] 75	200	104	165
South Atlantic	92	180	97	139	106	144	79	125	110	122
East South Central	162	171	202	185	331	205	243	219	209	232
West South Central	127	339	[2] 88	396	108	434	213	480	172	427
Mountain	17	70	60	26	34	17	120	61	26	44
Pacific	102	87	118	121	78	111	109	97	73	84

MEASLES CASE RATES

	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929
98 cities	36	30	[2] 37	30	[3] 61	38	[4] 58	44	93	56
New England	44	58	69	29	[5] 125	27	[6] 94	20	157	45
Middle Atlantic	23	17	30	21	[7] 29	33	35	20	71	26
East North Central	14	40	16	47	18	40	16	68	17	91
West North Central	140	31	140	21	288	52	[8] 275	94	491	50
South Atlantic	7	9	13	9	18	15	44	9	24	7
East South Central	7	0	27	21	47	0	94	7	20	14
West South Central	4	4	[2] 4	15	0	0	0	4	0	19
Mountain	189	52	137	26	403	244	223	61	300	252
Pacific	66	72	21	63	28	58	28	113	38	142

SCARLET FEVER CASE RATES

	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929
98 cities	123	138	[2] 123	138	[3] 165	155	[4] 172	191	191	205
New England	148	173	144	162	[5] 195	177	[6] 204	276	253	265
Middle Atlantic	90	69	82	75	[7] 139	89	140	102	133	135
East North Central	179	214	172	192	220	226	234	295	290	311
West North Central	114	173	114	173	159	160	[8] 137	187	140	139
South Atlantic	115	127	148	174	152	139	145	167	141	238
East South Central	148	232	169	109	277	205	331	178	310	157
West South Central	78	103	[2] 73	149	71	149	97	152	127	152
Mountain	232	157	163	235	335	226	275	357	378	226
Pacific	59	113	104	104	54	181	111	176	116	179

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930, and 1929, respectively.
[2] Fort Smith, Ark., not included.
[3] Concord, N. H., and Buffalo, N. Y., not included.
[4] Hartford, Conn., and Waterloo, Iowa, not included
[5] Concord, N. H., not included.
[6] Hartford, Conn., not included.
[7] Buffalo, N. Y., not included.
[8] Waterloo, Iowa, not included

Summary of weekly reports from cities October 12 to November 15, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

SMALLPOX CASE RATES

	Week ended—									
	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929
98 cities	2	12	[2] 2	10	[3] 3	13	[4] 2	9	4	13
New England	0	0	0	0	[5] 0	0	[6] 0	2	0	25
Middle Atlantic	0	0	0	0	[7] 0	0	0	0	0	0
East North Central	4	7	2	12	1	20	4	15	2	22
West North Central	0	21	0	31	19	42	[8] 6	20	21	42
South Atlantic	0	0	0	0	0	0	0	0	0	0
East South Central	0	0	0	0	0	14	0	0	0	0
West South Central	4	0	[2] 8	0	4	27	7	8	4	4
Mountain	26	122	0	52	9	61	9	17	0	9
Pacific	0	84	21	51	17	29	7	19	21	31

TYPHOID FEVER CASE RATES

	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929
98 cities	17	17	[2] 18	15	[3] 14	11	[4] 11	9	15	8
New England	9	9	27	16	[5] 4	7	[6] 5	11	22	22
Middle Atlantic	11	8	13	8	[7] 10	8	5	8	4	3
East North Central	7	10	5	7	8	6	9	6	5	6
West North Central	15	25	8	6	13	17	[8] 4	12	19	4
South Atlantic	57	24	37	21	29	13	29	13	31	9
East South Central	47	68	94	48	115	34	27	21	54	14
West South Central	22	15	[2] 27	42	15	19	30	11	93	8
Mountain	34	192	77	200	0	78	17	17	26	44
Pacific	26	19	19	5	21	2	19	7	12	10

INFLUENZA DEATH RATES

	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929
91 cities	5	8	5	9	[3] 9	11	[6] 9	8	10	9
New England	7	2	2	0	[5] 2	2	[6] 2	4	4	9
Middle Atlantic	4	6	7	12	[7] 10	9	13	8	9	4
East North Central	4	9	3	10	6	9	6	8	9	9
West North Central	3	9	9	3	9	6	3	3	6	3
South Atlantic	5	9	4	4	16	19	9	4	5	11
East South Central	0	7	7	22	15	30	29	37	44	22
West South Central	8	16	8	20	23	27	15	12	31	31
Mountain	9	17	9	17	17	26	9	0	9	26
Pacific	9	6	9	3	3	3	9	16	6	9

PNEUMONIA DEATH RATES

	Oct. 18, 1930	Oct. 19, 1929	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929
91 cities	74	97	89	108	[3] 100	105	[6] 104	105	118	98
New England	80	97	91	63	[5] 96	74	[6] 82	119	104	88
Middle Atlantic	74	118	108	144	[7] 112	113	122	115	136	103
East North Central	51	81	53	91	88	101	75	78	86	71
West North Central	53	69	59	72	95	135	86	108	77	120
South Atlantic	88	81	125	112	123	116	139	137	157	107
East South Central	184	112	96	134	74	157	155	90	214	231
West South Central	96	90	134	86	111	105	119	125	111	121
Mountain	189	122	77	122	163	131	189	131	215	157
Pacific	80	82	74	44	40	31	52	72	83	85

[2] Fort Smith, Ark., not included.
[3] Concord, N. H., and Buffalo, N. Y., not included.
[4] Hartford, Conn., and Waterloo, Iowa, not included.
[5] Concord, N. H., not included.
[6] Hartford, Conn., not included.
[7] Buffalo, N. Y., not included.
[8] Waterloo, Iowa, not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended November 15, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended November 15, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia	2	8		1		6
New Brunswick						16
Quebec	1	1				17
Ontario	2	4		19	14	32
Manitoba		1		2		1
Saskatchewan			1			
Alberta				2		
British Columbia						7
Total	5	14	1	24	14	79

[1] No case of any disease included in the table was reported during the week.

Ontario Province—Communicable diseases (comparative)—Four weeks ended October 25, 1930.—During the four weeks ended October 25, 1930, and the corresponding period of the year 1929, certain communicable diseases were reported in the Province of Ontario, Canada, as follows:

Disease	Four weeks 1929		Four weeks 1930	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	11	1	7	2
Chancroid	1		3	
Chicken pox	587		380	
Diphtheria	369	18	373	11
Dysentery	5	7		17
German measles	4		7	
Goiter	1	1	1	2
Gonorrhea	212		95	
Influenza	2	5	9	5
Lethargic encephalitis	3	4	1	1
Measles	399	1	57	
Mumps	94		152	
Paratyphoid fever			8	
Pneumonia		131		101
Puerperal fever			1	
Scarlet fever	333		435	1
Septic sore throat	6			
Smallpox [1]	9		34	
Syphilis	181		109	3
Tetanus				1
Tuberculosis	112	44	134	48
Typhoid fever	77	3	126	11
Undulant fever			13	1
Whooping cough	188	10	315	2

[1] The cases of smallpox were distributed as follows: Ottawa, 14; Crosby and Mason, 10; Kingston Tp., 4; Kingston, 2; Kirkland Lake, 2; Leamington, 1; and Wiarton, 1.

Quebec Province—Communicable diseases—Week ended November 15, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended November 15, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	33
Chicken pox	96	Ophthalmia neonatorum	8
Diphtheria	51	Scarlet fever	110
Erysipelas	4	Tuberculosis	46
German measles	1	Typhoid fever	17
Influenza	1	Whooping cough	62
Measles	59		

ITALY

Communicable diseases—Years 1927–1929.—The Director General of Public Health of Italy reports cases of certain communicable diseases for the years 1927, 1928, and 1929 in the Kingdom of Italy as follows:

Disease	Cases		
	1929	1928	1927
Anthrax	2,003	1,987	2,168
Cerebrospinal meningitis	770	561	484
Chicken pox	13,797	13,190	12,820
Diphtheria and croup	24,035	19,247	18,879
Dysentery (amebic)	467	320	532
Dysentery (bacillary)	837	1,121	1,579
Glanders	38	39	9
Influenza	279,444	76,660	119,635
Leprosy	71	63	54
Lethargic encephalitis	227	253	347
Malaria	206,590	244,650	192,738
Measles	99,609	114,979	100,195
Pellagra	98		
Poliomyelitis	1,117	583	404
Rabies	45	44	57
Scarlet fever	21,114	17,515	19,949
Smallpox	6	52	60
Typhoid fever	31,128	31,609	36,794
Undulant fever	956	959	1,071
Whooping cough	19,386	30,823	34,737

JAMAICA

Communicable diseases—Four weeks ended November 8, 1930.—During the four weeks ended November 8, 1930, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica outside of Kingston, as follows:

Disease	Cases		Disease	Cases	
	Kingston	Other localities		Kingston	Other localities
Cerebrospinal meningitis		1	Lethargic encephalitis		1
Chicken pox		14	Paratyphoid fever		1
Dysentery		4	Puerperal fever		2
Erysipelas		1	Tuberculosis	36	59
Leprosy		3	Typhoid fever	9	62

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22
Afghanistan	C			[1] P	P													
China:																		
Amoy	C							1	1									
	D							1	1									
Canton	C	3	2	2							1			1				
	D			1														
Shanghai	C					8	4		22	23	5	6	4	1		1		
	D						1	1	1	2			2					
Shensi Province	C								P									
Swatow	C	3	7		3	1	1											
Tientsin	C				2	1												
India	C	56,311	37,102	26,121	42,893	14,249	11,823	13,072	12,407									
	D	44,878	25,711	13,822	22,358	5,879	5,732	6,409	5,939									
Bassein	C	7					1											
	D	5																
Bombay	C				14			1		1	3	1	11	17	1	1		
	D				8			2		1	2		8	10	6	1		
Calcutta	C	609	327	220	63	8	10		9	4	4	7	9	7	7	11		
	D	372	179	128	30	3	3		6	3	4	4	4		2	6		
Madras	C				1							2						
	D				1							2						
Negapatam	C		1															
	D		1															
Rangoon	C	9	6	1	1	1	1					1						
	D	3	4	1	1	1						1						
Tuticorin	C												1				1	
	D												1				1	
India (French):																		
Chandernagor	C	6	3	1			1				1	2						
	D	6	2								1							
Karikal	C		3															
	D		3															
Pondicherry	C											1						
	D											1						
India (Portuguese)	C				1		1											

Indo-China (see also table below):																		
Phnompenh	C	1	40	32	11					1		1		1				
	D	5	18	22	6													
Saigon and Cholon	C	160	48	10	5					1	1			1				
	D	101	23	3	1													
Philippine Islands:[2]																		
Ports—																		
Cebu	C		1	65	9	1	1											
	D			36	8	1	1											
Iloilo	C			29	64	3	4	1	2	1								
	D			22	56	4	5	2	3	2			2					
Manila	C	1			1	16	13	10	4	2	1	2						
	D					5	6	1			1							
Provinces—																		
Antique	C				20	2	25	12	8	12		28						
	D				12	1	14	12	7	8		10						
Bohol	C				138	30	14	4	1									
	D				79	12	6	2										
Bulacan	C		3	4	1	1	2	1			2							
	D		1			1	1				1							
Capiz	C			3	2	1												
	D			2	2													
Cebu	C	1	355	713	85	1	16	8										
	D	1	170	303	50	1	6	4										
Iloilo	C		2	309	571	71	60	61	46	18	7	13	12	10	10	4	6	11
	D		1	193	376	45	45	35	26	15	6	7	12	7	7	3	6	8
La Union	C			1														
Leyte	C		47	11														
	D		19	11														
Masbate	C		10	92	34													
	D		3	35	14													
Misamis, Occidental	C			3														
	D			3														
Negros, Occidental	C	10	140	568	343	40	43	24	15	8	10	5	5	12	3	19	22	44
	D	7	88	368	237	32	30	20	9	6	5	6	3	12	3	12	14	33
Negros, Oriental	C			23	8													
	D			13	4													
Nueva Acija	C			1														
	D			1														
Pampanga	C		2	2		1												
Pangasinan	C			3	1													
	D			2	1													
Rizal	C		1	1														
	D		1	1												4		
Samar	C				18			3	1	4			3	6	3	4	3	4
	D				16			2		4			3	5	1	4	2	4
Sorsogon	C															5		
	D																	
Surigao	C				28	1				(3)								
	D				17	2												
Tarlac	C				1													

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, Philippine Islands.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930				October, 1930				November, 1930			
							6	13	20	27	4	11	18	25	1	8	15	22
Siam	C	33	27	20	3							1	3	3		1		
	D	21	19	9	2								1	3		1		
Bangkok	C	9	12	8	1							1	2	1	2			
	D	3	5	3	1							1	1	1	1			
Songkla	C			10														
	D			6														
On vessel:																		
S. S. Malwa from Shanghai	D								1									
S. S. Sassari at Massoua, from Jeddah	C	1																
	D	1																
On small boat at Port Cebu, from Bantayan Island	C		1															
	D		1															

Place		April, 1930	May, 1930	June, 1930	July, 1930	August, 1930			September, 1930			October, 1930		
						1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (French) (see also table above):														
Annam [1]	C	60	23	16	1		3							
Cambodia [1]	C	24	88	144	43	37	22		23	13	2	16		6
Cochin-China [1]	C	48	671	273	46	22	5		9	6	18	14	6	8

[1] Reports incomplete.

PLAGUE

Place		May 4–31, 1930	June 1–28, 1930	June 29–July 26, 1930	July 27–Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930 6	13	20	27	October, 1930 4	11	18	25	November, 1930 1	8	15
Algeria:																	
Algiers	C			3	7	1	2	6	2	1	1	2	2	5		1	
	D													3			
Constantine	C		1	1												1	
Oran	C			3	4	1	2	3	4		4	4	2	1			
	D							1				2	1				
Plague-infected rats				2			10			2			4	1			
Philippeville	C						1			1		1	1	1		1	
Belgian Congo	C			2	2	2	3										
	D			2	2		3										
British East Africa (see also table below): Uganda	C	227	406	228	236	44	40	57	61	65	18						
	D	195	328	213	229	37	39	55	60	65	18						
Canary Islands: Las Palmas	D				1												
Ceylon:																	
Colombo	C	6	1	3	2	2				1	1		1				1
	D	5	1	3	2	3				1	1		1				1
Plague-infected rats			1	1													
China:																	
Manchuria—Tungliau and Nungan	C				30			29	P	2							
Shensi	C								P					P			
Dutch East Indies:																	
Batavia and West Java	C	82	98	84	83	13	14	26	26	22	14	26					
	D	82	98	84	83	12	14	26	24	22	14	26					
Plague-infected rats		5	4		1		1	1	1								
Java and Madura	D	185	202	217	188	55	54	67	84	75	68						
Ecuador (see table below).																	
Egypt:																	
Alexandria	C	13	19	23	11	3	3	2	2	2	1	3	3	2	1	1	3
	D	3	9	10	6	5	1	2		3	1	1	1	3		2	2
Assiout	C	20	9	2												3	
	D	5	3	2												1	
Beni-Suef	C				1												
Dakahlieh	C	11	1														
	D	2															
Gharbieh	C				3												
	D				1												
Girga	C			1		1											
Minieh	C	7	10	3													
	D	1	1														
Port Said	C	2	2	1	1									1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930 6	13	20	27	October, 1930 4	11	18	25	November, 1930 1	8	15
France:																	
Marseille	C					2	2	1					4	2	1		
St. Ouen	C			1													
	D			1													
Gambia	C				4												
	D				4												
Greece (see also table below):																	
Patras	C		1	1													
Pyrgos	C										2						
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats			1														
India	C	648	240	377	877	593	600	704	600								
	D	635	187	256	477	262	291	328	251								
Bassein	C					1		1							1		
	D					1		2									
Bombay	C	6	3	1			1			1			1	1			
	D	5	2	1			1				1		1		1		
Plague-infected rats		81	26	52	35	12	9	11	15	21	13	16	14	2	9	11	
Madras Presidency	C	38	39	47	81		47	41	39	41	59	7					
	D	11	22	31	34		23	13	21	14	32	9					
Rangoon	C	4	1	2	3	2	1	5	2	2					1		
	D	3	1	2	2	2	1	4	2	2					1		
Plague-infected rats		5	1	6	7	2		2	4		1			1			
India (Portuguese)	D	7			P												
Indo-China (see also table below):																	
Pnompenh	C	3	6	2	4	2	1			1	1						
	D	1	7	2						1	1	1		1			
Saigon and Cholon	C	1	2		1		1			1							
	D		1														
Iraq: Baghdad	C	37	28	18	9					1							
	D	18	15	7	3					1							
Kwang-Chow-Wan	C	34	31	4	1												
Madasgascar (see also table below): Tamatave	C		1	1	2		1	P			1			3		2	
	D										1			3			
Morocco	C	71	3	1	15									4		1	
	D	34	4		2												
Nigeria: Lagos	C	2	5	1	7	1	1	3	1		3		2	33			
	D	2	5	1	7	1	1	3	1		3		2				
Plague-infected rats		17	11	18	8		4	2	4					3			

Place																	
Senegal (see table below).																	
Siam	C	5	-	-	7	3	-	-	-	-	-	-	-	3	1	1	-
	D	4	-	-	6	2	-	-	-	-	-	-	-	3	1	-	-
Bangkok	C	5	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
	D	4	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Nagara Rajsima	C	-	-	-	2	-	1	-	-	-	-	-	1	-	-	-	1
	D	-	-	-	2	-	1	-	-	-	-	-	1	-	-	-	1
Syria: Beirut	C	-	12	9	2	3	2	-	-	-	-	-	-	1	-	3	1
Tripolitania	C	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Tunisia:																	
Sfax district	C	21	9	6	1	-	-	-	-	-	-	-	-	-	-	-	-
Tunis	C	1	1	5	-	-	-	-	-	-	-	-	-	-	1	-	-
	D	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Union of Socialist Soviet Republics:																	
Salsk Region	C	-	2	5	7	-	-	-	-	-	-	-	-	-	-	-	-
	D	-	1	4	5	-	-	-	-	-	-	-	-	-	-	-	-
Stavropol Region	C	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	D	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Union of South Africa:																	
Cape Province	C	P	1	1	1	-	-	-	1	-	-	-	-	-	-	-	-
	D	-	-	1	1	-	-	1	-	-	-	-	-	-	-	-	-
Orange Free State	C	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-
	D	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	107	97	87	53	7
Ecuador: Guayaquil	C	0	0	-	-	-	-
	D	0	0	-	-	-	-
Plague-infected rats		0	0	-	-	-	-
Greece (see also table above)	C	-	1	-	-	-	-
Indo-China (see also table above)	C	-	11	1	2	4	-
Madagascar (see also table above):							
Ambositra Province	C	1	-	-	-	-	-
	D	1	-	-	-	-	-
Antisirabe Province	C	19	3	24	11	-	-
	D	19	3	24	11	-	-
Miarinarivo Province	C	5	1	1	2	-	-
	D	5	1	1	2	-	-
Moramanga Province	C	1	3	-	27	-	-
	D	-	3	-	27	-	-
Madagascar (see also table above)—Con.							
Tananarive Province	C	15	16	28	39	-	-
	D	14	16	28	38	-	-
Senegal:							
Baol [1]	C	13	2	62	79	48	53
	D	11	2	48	20	23	35
Dakar [1]	C	52	53	140	108	3	-
	D	42	117	122	90	8	-
Louga [1]	C	54	60	138	75	61	37
	D	27	21	103	33	30	25
Thies [1]	C	21	52	54	34	12	24
	D	8	35	30	20	4	15
Tivaouane [1]	C	135	43	119	110	20	53
	D	69	28	70	54	14	31

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930 6	September, 1930 13	September, 1930 20	September, 1930 27	October, 1930 4	October, 1930 11	October, 1930 18	October, 1930 25	November, 1930 1	November, 1930 8	November, 1930 15
Algeria:																	
Algiers	C	3		1	3												
Constantine	C		1	1												1	
Arabia: Aden	C			1													
Bolivia: La Paz.[1]																	
British East Africa (see also table below):																	
Tanganyika	C	409	1,610	168	242	198	288		36	27	43	4	21				
	D	70	301	42	37	4	55		1	1		1	4				
British South Africa:																	
Northern Rhodesia	C	59															
	D	9															
Southern Rhodesia	C	155	79	31	1	1				14	39	98					
	D	13															
Canada:																	
Alberta	C			5	1				1		13	8	1				
British Columbia—Vancouver	C	4	2	6	6			1	1	1			1		3		
Manitoba	C	10	4			1											
Ontario	C	82	47	24	20	2	2	6		1		3	15		20	9	
North Bay	C	1															
Ottawa	C	25	15	13	7	2	1	2						14		9	14
Toronto	C	4	4	1				1									
Quebec	C		4	3	5												
Montreal	C				7												
Saskatchewan	C	39	22	5	8			1			3				2		
Regina	C	4															
China:																	
Changking	C	P	1	P	P	P	P	P	P	P	P	P					
Foochow	C	P	P	P	P		P		P		P						
Hong Kong	C	12	4	2													
	D	9	3	1													
Manchuria—																	
Harbin	C	20	4	3	2												
Kwantung—Dairen	C	8	16	8													
	D	4	1														
Nanking	C	P	P	P	P	P	P	P	P	P	P	P	P	P			

Shanghai—																	
Foreigners only	C	2	5	4	3			18					1	1		1	
Including natives	D	5	3					2									
Swatow	D	6	4	1	4	1	1			1			3	1	1		
Tientsin	C	1								1							
Chosen (see table below).																	
Colombia:																	
Barranquilla	C				2												
Buenaventura	C	4	6	10	2												
Cali	D										4		1				
Costa Rica:																	
Port Limon	C	2	2														
San Jose	C	2															
Curacao (alastrim)	C	2	1	2	1												
Dutch East Indies:																	
Borneo	C	16	12	2													
	D	1	1														
Java—																	
Batavia and West Java	C	12	13	8	12	2	5	2	2	10	2	1					
	D	7	3	5	5	2		1	1	1	1	1					
East Java and Madura	C			1													
Sanggi Islands	C	26		11	36	14											
	D	5		3	2	3											
Egypt: Port Said	C	1		3													
France (see table below).																	
Great Britain:																	
England and Wales	C	1,417	926	529	344	99	106	75	61	82	74	44	125	86	87	92	
Ashton under Lyne	C	17	7	8													
Bradford	C	2		1							1	1	1				
Cardiff	C			2										1			
Leeds	C			1										1			
London	C	637	498	250	178	43	44	36	41	30	34	23	33	20	32	41	
London and Great Towns	C	1,078	753	408	285	79	84	51	54	55	56	32	80	52	58	68	
	D											1			1		
Stoke-on-Trent	C	62	32	9	2			1	1			1			1		
Scotland	C		4	1			5										
	D			1													
Honduras: Naco	C							5									
India	C	22,835	12,962	7,630	4,877	830	940	610	751								
	D	5,451	3,531	2,348	1,246	202	209	119	150								
Bombay	C	218	113	50	12	2	1	1	2								
	D	161	79	33	10	2	1	2									
Calcutta	C	302	161	73	25	4	5	3	2	3	4	3	2	2	4	3	
	D	258	146	56	21	3	4	1	1	3	4	3	1	2	2	3	
Cochin	C	37	16	6	14	1	1		1			8	4	3	5	10	
	D	8	4			1						1		1			
Karachi	C	14	7	1	4			1	3								
	D	4	3		3				2								
Madras	C	72	35	49	38	9	11	6	8	4	4	8	3	2	1	2	
	D	15	10	12	11	1	1	1	3	1	2	3	2			2	

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930 6	13	20	27	October, 1930 4	11	18	25	November, 1930 1	8	15
India—Continued.																	
Moulmein	C	89	21	18	2	1											
	D	21	7	1	1			1									
Negapatam	C	1	2	4	4	1	2		6	4	2	5	3	2	2	2	
Rangoon	C	6	9		3								2			5	
	D	1	2														
Tuticorin	C	5	1										1				
Vizagapatam	C	5	1									1					
India (French):																	
Chandernagor	C	24	19	4				1	2			3			3		
	D	7	3	3			1	1				1			1		
Karikal	C	12	11	2	9		5			1							
	D	3	8	2	9		2			1							
Pondicherry Province	C	40	23	26	22	11	7	7	10	11	10	6	11	1			
	D	36	23	25	22	11	7	7	8	11	8	6	11	1			
India (Portuguese)	C	47	28	1	9	1	2		1								
	D	8	10	1	2												
Indo-China (see also table below):																	
Pnompenh	C	3		1								2					
	D		1	1	1												
Saigon and Cholon	C	3	1		1	1									2		
	D	2			3	1									2		
Iraq:																	
Baghdad	C	1	1	3	1				1		2						
	D	1		1	1												
Mossoul Liwa	C	21	4	67						63		4	2			6	
	D	3	1	20						27							
Ivory Coast (see table below).																	
Jamaica (alastrim)	C	2															
Macao	D	1															
Mexico (see also table below):																	
Jalisco (State) Guadalajara	D	7	15	4	1						2		1	1		1	1
Juarez	C		6		2												
	D		1		1					1				1			

Mexico City and surrounding territory	C	80	77	37	10	7	2	1	2	1	3	5	4	1			
	D	32	17	8	6	1	1	1	2			1	2	1			
Progreso	C	1															
	D	1	1														
Vera Cruz	C														1		
Morocco (see table below).																	
Nigeria: Lagos	C		1														
Poland	C	3	2												3		
Portugal:																	
Lisbon	C	8	10	13	50	7	8		12	4	5		7	12			
Oporto	C				1												
Siam	C	2		6							1						
	D			3													
Somaliland, British: Boales	C										1					1	
	D										1						
Spain	C		12	5	2		4	1						14	5		
Straits Settlements	C	11	9	11	8	1	2	2	1	1	1	1	2	3	3	4	
	D	3	2	3	3		1					1			1	1	
Sudan (Anglo-Egyptian)	C	19	67	12	42	102	5	20	1	25	1	56		3			2
	D	2	3	1	3	50	2			2		5					1
Sudan (French) (see table below).																	
Switzerland: Berne Canton	C			1	2					1							
Syria (see table below).																	
Taiwan: Taihoku (see table below).																	
Tunisia: Tunis	C	2	2	1					2								
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P		P			P	P	P			P					
Orange Free State	C			P	P												
Transvaal	C				P	P	P	P	P	P		P					
Upper Volta	C	1	13														
On vessel:																	
S. S. Naldera, at Port Said	C	1															
S. S. Manoa, from Honolulu to San Francisco	C			1													

Place		April, 1930	May, 1930	June, 1930	July, 1930	August, 1930			September, 1930			October, 1930		
						1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (see also table above)	C	261	305	213	238	59	34		54	52	86	32	62	164
Ivory Coast	C													4
Sudan (French)	C	521	274	76	34			39		P			17	
	D	36	32	18				3					2	
Syria: Beirut	C	19	7	7	2	1								
Taiwan: Taihoku	C	12												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	142	186			
Uganda	C	78					
	D	69					
Chosen	C	107		3	2		
	D	35					
Seishin	C	2	1	2			
	D	1					

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
France	C	51		1			
Mexico: Durango (see also table above)	D	4	3	3	3	2	
Morocco	C	18	5	3	8	1	4
Turkey	C	16					

TYPHUS FEVER

Plac		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	Week ended— August, 1930: 2	9	16	23	30	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8
Algeria:																			
Algiers	C	15	3	6				2		3									
Constantine Department	C	6	12	2				3						2			1		
Oran	C	3	4	3		1			1						1	2			
Bolivia: La Paz.[1]																			
Brazil. Porto Alegre	C	1																	
Bulgaria	C	6	16	10		1				2	2		2		1	3			
	D	2	1	1															
China:																			
Manchuria—Harbin (see also table below)	C	13	8	2	2				2										
Shanghai	C					1													
Chosen (see table below).																			
Czechoslovakia (see table below).																			

Egypt:																			
Alexandria	C		1	1			1			1	1	1	1						
Beheira Province	C	49	45	15								1							
	D	13	4	2															
Cairo	C				2			5			1								
Port Said	C							4		1				1			1		
Great Britain: Scotland—																			
Dunfermline	C			1															
Glasgow	C	1																	
	D	1																	
Greece (see table below).																			
Ireland:																			
Irish Free State—																			
Galway County—Oughterard	C			2															
Leitrim County—Mohill	C		9	1															
Mayo County—																			
Ballina	C	2	1	1															
Castlebar	C							1											
Swinford	C	14																	
Westport	C			2	1														
Roscommon County—																			
Roscommon	C			1															
Strokestown	C			1															
Wicklow County—Shillelagh	C		4	2															
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico:																			
Durango	D											1	1		1				
Mexico City, including municipalities in Federal District	C	6	9	5	2	2	2	3	2	2	3				3	5	1		
	D	3	1		1	1				1	1				2		1		
Morocco	C	11	15	11				8		2							1		1
	D															1			
Palestine	C	2	2	6		1	1	1		1	1	1		1	1	1			
Poland	C	171	117	36	10	15	2	7	2	3	6	12	3	6	6	7	7	8	
	D	5	11	4	1		1	1		1			1			1			
Portugal: Oporto	C						1							1	1	1		2	
Rumania	C	227	58	28	5		2	2	1		1	2	3	4					
	D	35	5	8	2														
Spain	C		3	3							1					1			
	D			1							1					1			
Tunisia	C	6	18	24	2	5		3	1	1		4	1	1	1	9			
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
Municipality of East London	C			1								2			1				
Natal	C	P	P	1	P	P	P				P			P	P				
Orange Free State	C	P	P	P	P	P	P	P	P	P	P	P							
Transvaal	C			P	P	P	P		P	P	P	P	P	P	P				
Yugoslavia (see table below).																			

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
China: Harbin (see also table above)	C	240		14	5		
Chosen: Seoul	C	43	2	3	2	1	
Czechoslovakia	C	12	1		1		
Greece: Athens	C	3	3	6	6		
Latvia	C	3	3	3	1		
Lithuania	C	27	16	18	7	24	1
	D				1	2	
Turkey	C	16	2		2		
Yugoslavia	C	16	6				
	D	1					

YELLOW FEVER

Place	Cases
Brazil:	
Mage, on the Leopoldina Ry., between Rio de Janeiro and Nictheroy, Apr. 22, 1930	2
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold Coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

UNITED STATES TREASURY DEPARTMENT

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SPECIAL ARTICLES

Effect of Glutathione on Cell Division

Blacktongue Preventive Value of Minot's Liver Extract

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1930

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PUBLIC HEALTH REPORTS

VOL. 45 DECEMBER 12, 1930 NO. 50

THE CHEMISTRY OF CELL DIVISION

I. THE EFFECT OF GLUTATHIONE ON CELL DIVISION IN AMOEBA PROTEUS

By CARL VOEGTLIN, *Professor of Pharmacology*, and H. W. CHALKLEY, *Physiologist, Division of Pharmacology, National Institute of Health, United States Public Health Service*

Introduction

Cell division is a fundamental process in the normal growth of organisms and, in its pathological aspect, is one of the outstanding characteristics of neoplastic growth. All problems, therefore, which in their solution will tend to increase knowledge of the factors, physical or chemical, which initiate or control cell division, are of great importance to biology, medicine, and particularly to progress in the solution of the cancer problem.

As is well known, the morphological changes incident to cell division have been studied in great detail on a great variety of different cells; but there can be no doubt that morphological evidence alone, while of great importance, will never lead to an adequate understanding of cell division. It is obvious that the chemical phase of the problem is quite as important, if not more so, than the morphological side.

A review of the literature dealing with cell division reveals that several hypothetical and more or less vague views have been put forward in attempts to explain cell division on a chemical basis.

A brief glance at some of the more influential concepts as to the causal agencies in cell division may not be amiss at this point. R. Hertwig (1903) proposed his theory of "Kern-plasma Verhältnis." This theory, foreshadowed by Verworn (1899, p. 529–31), postulated that for a given cell there exists a size ratio between cytoplasm and nucleus, which if exceeded by reason of an increase in nuclear material as regards the cytoplasm, produces metabolic changes that result in cell division. The best evidence for the validity of this view is probably that adduced by Popoff (1909) for the ciliate *Frontonia*, and by Hegner (1920) for the rhizopod *Arcella*. Calkins (1926), however, notes that in *Uroleptus* and other forms, the many nuclei ordinarily present fuse to form a single compact nucleus of relatively small

volume just prior to division, and he therefore concludes that "it would seem that such changes in the relative volume of nucleus and cytoplasm are better interpreted as the effects of underlying conditions which cause division rather than as a cause of division themselves." Conklin (1912) reaches a similar conclusion as a result of his extensive research on the nucleo-plasmic ratio in developing echinoderm eggs.

Of recent years Robertson (1921) championed the theory that the living cell secretes and releases into the surrounding medium a substance of unknown chemical composition that stimulates neighboring cells to divide. His conclusions in this respect are contested by Woodruff (1911), Cutler and Crump (1923–1925), Greenleaf (1924–1926), Peskett (1925), Myers (1927), and Darby (1930). Finally, a recent theory is that of Gurwitsch (1923) based on extensive research by himself and his coworkers, which lead him to postulate the emission by living cells of ultra-violet light of definite wave length, which light impinging upon other cells acts as a stimulant to division. The validity of this theory is still a matter of controversy.

Hammett (1929) has advanced the theory that substances containing the sulphydril group play a specific rôle in cell division, and in the production of neoplasms. He goes as far as to claim that the sulphydril group is *the only specific* chemical factor controlling cell division.

A priori Hammett's hypothesis seems likely to err on the side of simplicity in view of the multiplicity of factors involved, and particularly in view of the partial independence in division of nucleus and cytoplasm. It must be constantly kept in mind that the division of a cell is not the division of a homogeneity, but a division of a heterogeneous system, the several parts of which are themselves divided (in some cases probably quantitatively, as in chloroplasts) prior to the division of the cell, and this view is extended by some to practically all morphological cell components. Wilson (1923) assumes this attitude, for he says:

> For my part I am disposed to accept the probability that many of these particles, as if they were submicroscopical plastids, may have a persistent identity perpetuating themselves by growth and multiplication without loss of their specific individual type.

The fact that this mass of heterogeneous particulate protoplasm, the cell, is quantitatively divided is sufficient to show that the study of cell division is, from any viewpoint, a task of enormous complexity.

Calkins (1926, p. 204) well describes the present situation. He says:

> In order to understand the relation of division to the chain of metabolic activities we should know more about the conditions under which division occurs and the causes of division.

However, no matter what view is taken as to the causes or control of cell division in terms of cell activity, it would seem certain that underlying any such action definite chemical substances must play an important if not a unique rôle. Hence, attempts to initiate or control cell division by chemical means, either by alteration of the chemical environment or direct introduction of chemicals into the cell, is a logical procedure. Alteration of the environment is simple and has already yielded results in at least one direction in that it has made possible the separation of certain chemical factors.

Cytoplasmic division may be inhibited by lowered oxygen tension, as shown by Demoor (1894) in experiments on plants (*Tradescantia*), and by Loeb (1899) with sea urchin eggs. The same result was also obtained with narcotics (chloroform and ether) by Demoor (1894) on *Tradescantia*, and on sea urchin eggs by Wilson (1901) and Chambers (1924). Under the conditions imposed by these workers nuclear division was not immediately prevented, proving that a certain degree of independence exists, in respect to division, between cytoplasm and nucleus. Further references will be found in a recent summary by Pràt and Malkovsky (1927).

Increase in the rate of cell division has been claimed by Shumway (1917) to result in *Paramecium* from treatment with crude thyroid extract. Recently, Hammett (1929) found that substances containing the sulphydril group accelerated the rate of division of certain plant root cells and *Paramecium*.

Formulation of Problem

As we are primarily interested in neoplastic growth in animals, we shall deal here exclusively with the chemistry of cell division in animal cells.

What is meant by the "chemistry of cell division"? What experimental procedures will yield valuable information in the study of this problem? We believe that it is essential to formulate our views with respect to these two questions before proceeding any further.

When a cell divides the daughter cells obviously are smaller than the parent cell. Under proper physiological conditions the daughter cells will take up from the environment nutrient material and grow in size. Cell division again occurs, and so on. *Growth of cells* (increase in mass of protoplasm) and *cell division* (increase in cell number), therefore proceed continually under these conditions.

Normal *cellular growth* over an extended period of several generations of cells unquestionably requires an adequate supply of food, which fulfills the energy requirements of the cells and contains, in sufficient amounts, *all* the different chemical substances needed for the building up of new protoplasm. Hence it is obvious that the continued growth of protoplasm is conditioned by a great variety of

chemical factors. Now, it is a fact that under all conditions of growth there is a limit to the size of cells beyond which they can not grow; and in order to increase the total mass of protoplasm, the cells must divide before growth can again proceed. *The chemistry of cell division, therefore, concerns itself with the chemical factors which control any one of the different phases of the division of cells, as distinguished from those chemical factors controlling the increase in the mass of protoplasm;* for there is good reason to believe that a cell may go through the division process *without* an accompanying increase in the mass of protoplasm. Taking into account the great chemical and morphological complexity of all cells and the complicated morphological changes involved in cell division, it would seem *a priori,* that more than one chemical factor would control this process in its different phases.

As to the *experimental procedures* to be used, it would appear from the above considerations, that conditions should be chosen which eliminate, as far as possible, the chemical factors operating in the increase in mass of protoplasm. This is of great importance in work with animal cells, as it is impossible at present to devise a "synthetic" medium of *known* and *exactly reproducible* chemical composition, which will support continued growth of protoplasm and cell division. If this were possible, it would obviously offer a splendid opportunity for the analytical determination of the components of this medium, which are specifically essential for cell division. We have chosen, therefore, *Amoeba proteus* as a suitable organism for the reason that it can be put for a number of days into a simple chemically reproducible, nonnutritive medium, without changing the organism sufficiently so as to prevent cell division.

Under these conditions it should be possible to ascertain the action of chemicals added to this medium upon cell division, as compared with the division in control animals. The question now arises as to what chemicals should be studied. In order to make progress, it would appear to us reasonable to begin with a study of those chemical components of cells which occur normally in relatively small amounts and to test the effect of very low concentrations of these substances on the rate of cell division of *Amoeba* under well-controlled conditions.

In choosing such substances we are guided by experimental evidence indicating that the metabolism of living organisms is *regulated* by chemical components, which normally occur in relatively *small amounts.* As examples, we may mention enzymes, certain hormones (Thyroxin), traces of certain heavy metals (Warburg's respiration enzyme), and vitamins. However, we do not mean to infer that the components occurring in relatively *large amounts,* such as proteins, fats, carbohydrates, and inorganic salts, are nonessential factors in the chemistry of cell division, but rather that these factors are *primarily* sources of chemical energy and that they furnish the chemical

building stones of protoplasm. There are indeed partial exceptions as in the regulation of the acid-base equilibrium, where major components exercise important regulatory functions. The concentration of the hydrogen ion in living protoplasm, however, is very low, and for this reason the hydrogen ion may be included in the class of minor components.

In view of Hammett's claims that sulphydril compounds increase the rate of cell division, we selected glutathione for the present investigation. This substance is of particular interest, as previous work has indicated that the glutathione content of rat embryos declines with the age of the embryo (Thompson and Voegtlin, 1926). Similar findings were published by Murray (1926) for chick embryos of different stages of development. Furthermore, Voegtlin and Thompson (1926) found that glutathione is present in malignant tumors in amounts as large as those in the liver, one of the normal organs richest in this substance. This finding was confirmed by Lecloux, Vivario, and Firket (1927). Finally, Baker (1929) found that the addition of small amounts of amorphous glutathione to certain culture media of sarcomatous fibroblasts of the rat exerted an accelerating effect on the growth of this tissue *in vitro*.

Chemically, SH glutathione is a tripeptide, composed of glycine, cysteine, and glutamic acid. The relation between SH glutathione and S–S glutathione can be presented as follows: $2\ R{\cdot}SH \rightleftarrows R{\cdot}S{-}S{\cdot}R$, where R represents the complex organic radical linked to sulphur. The arrows indicate the possibility of converting one form into the other by oxidation and reduction respectively. It has been established that this transformation is catalyzed by certain heavy metal salts and compounds.

Material and Method

Amoeba proteus is a unicellular rhizopod. It is relatively simple in structure, and is great enough (about 0.0008 to 0.006 cu. mm.) in volume and slow enough in locomotion to make handling and observation simple. It will live for several days (8–14) in the absence of food, and division has been observed under such conditions, personally and by Mast (1930). Culture of the organisms, however, can not as yet be made on synthetic media. This amoeba is not normally a bacterial feeder (Greenwood, 1886); therefore in excluding food it is not necessary entirely to exclude bacteria, but simply to wash the organism to remove larger forms, other protozoa, etc., which constitute the normal food. This is of considerable importance, as it obviates the need for an aseptic procedure.

The amoebae used were from a strain secured from Johns Hopkins University and conformed closely to the form *Amoeba proteus* (Schaeffer 1916). They were cultured in hard glass crystallizing dishes in 200

to 250 c. c. of saline solution made up as follows: 0.1 gram NaCl, 0.04 gram KCl, 0.06 gram $CaCl_2$, glass distilled H_2O to make 1,000 c. c. This solution is hereafter referred to as standard saline. To each dish was added 4 whole grains of polished rice. The pH of these cultures, when vigorous, was approximately 6.8. Addition of rice, as needed, served to keep the pH at about this figure.

All solutions used were made from C. P. chemicals and doubly glass distilled water. These chemicals undoubtedly contained minute traces of heavy metals; but as this is also true for the amoebae themselves, it did not appear that any end would be served by extreme precautions, especially as such traces would be common to both control and glutathione solutions.

We are indebted to Dr. J. M. Johnson for the glutathione used in this investigation. The crystalline SH glutathione was prepared according to Hopkins (1929), the final crystals being rapidly washed with cold glacial acetic acid to remove, as far as possible, traces of any heavy metals remaining in the product. The substance contained 13.65 per cent N (theory 13.68) and 10.69 per cent S (theory 10.40). The oxidized S–S glutathione was prepared from the crystalline SH glutathione by dissolving the crystals in a small amount of water, adding sufficient $Ba(OH)_2$ solution to make the solution faintly alkaline, and a drop of very dilute $FeCl_3$ solution. A rapid current of oxygen was then run through the solution at room temperature until the solution no longer gave the nitroprussid test. After removal of barium and concentration *in vacuo* at low temperature, the S–S glutathione was precipitated by absolute alcohol, filtered off, and dried to constant weight in a desiccator. The product contained 13.10 per cent N (theory 13.68) and 10.43 per cent S (theory 10.40). This product is evidently not absolutely pure, but yields better S and N figures than any oxidized glutathione described in the literature.

All solutions were buffered by addition of a small amount (2 to 3 c. c.) M/20 buffer to the liter of solution with Clark and Lubs phosphate buffers and the pH checked colorimetrically before and after each experiment.

It is evident that under conditions precluding feeding we could not expect to deal with comparisons of division rates. But it seems obvious that under such conditions if divisions can be evoked, differences in the per cents that divide in relatively large control and experimental groups can be considered as significant. The data then are presented in terms of percentages of division in the control and experimental groups.

Further, in view of the fact that deaths will occur during the experimental period, it was imperative that each cell be isolated and followed separately, since only in that way could the actual number

of divisions be accurately ascertained. Our procedure was then substantially as follows:

The amoebae were removed from the culture medium with a capillary pipette and washed twice in standard saline and placed singly on depression slides in a drop of the same saline. Examination of each amoeba, using a compound microscope with 20X ocular and 8 m. apochromat objective, was then made to insure that only mononuclear cells were used and the approximate volume of each cell in arbitrary units was ascertained. This was accomplished by stimulating the cell by repeatedly drawing it up into and ejecting it from a capillary pipette until it had assumed a spherical shape, and then measuring its diameter by use of the compound microscope and an ocular micrometer. Each amoeba was then transferred to a 25 c. c. Pyrex beaker containing 2 c. c. of the solution to be used in the contemplated experiment. Each amoeba and any cell originating from it was examined every 24 hours, using a binocular dissecting microscope, and at the time of examination was transferred to a fresh beaker containing the freshly made solution as before. When all examinations had been completed at the end of the experiment, the amoebae were fixed in 20 per cent acetic acid and examined with a compound microscope for nuclear changes, etc.

The organisms were kept throughout the experiments in a metal chamber which was provided with a water jacket, through which tap water from the city water supply was constantly flowing. This served to prevent rapid fluctuations in temperature.

The Effect of Glutathione on Division in Amoeba Under Survival Conditions

1. THE EFFECT OF REDUCED (SH) GLUTATHIONE

Preliminary experiments were performed to ascertain what concentration of the reagent was to be used. Small numbers (6 to 12) of amoebae were isolated into solutions containing SH glutathione in concentrations from M/10,000 to M/1,000,000 for periods of four days, and it was found that the greater number of nuclear divisions occurred in the solution containing M/50,000 and M/100,000 SH glutathione. The concentration of M/100,000 SH glutathione made up in standard saline was accordingly chosen for the initial tests; it is referred to hereafter as SH glutathione solution.

It was deemed advisable in view of both a possible nutrient effect of the nitrogen of the glutathione and the emphasis placed by Hammett on the SH group, to select for control a solution that would very closely approximate the glutathione solution as to nitrogen content and general chemical structure, but differ in containing no substance possessing the SH group. We therefore used a solution containing M/100,000 each of alanin, glycine, and glutamic acid, made up in the

standard saline. This solution is referred to hereafter as control solution.

The initial question was whether either control or glutathione solutions so prepared would be of nutritional value to amoebae. To test this 60 amoebae were selected. Twenty were individually isolated into standard saline and 20 into control solution. All solutions were buffered to pH 7.0. Daily observation, change of containers, and renewal of solutions were made, as described in the section on materials and methods, for a period of nine days (Sunday excepted). The results, plotted in terms of percentage of survivors as a function of time, are presented in graph A, Figure 1.

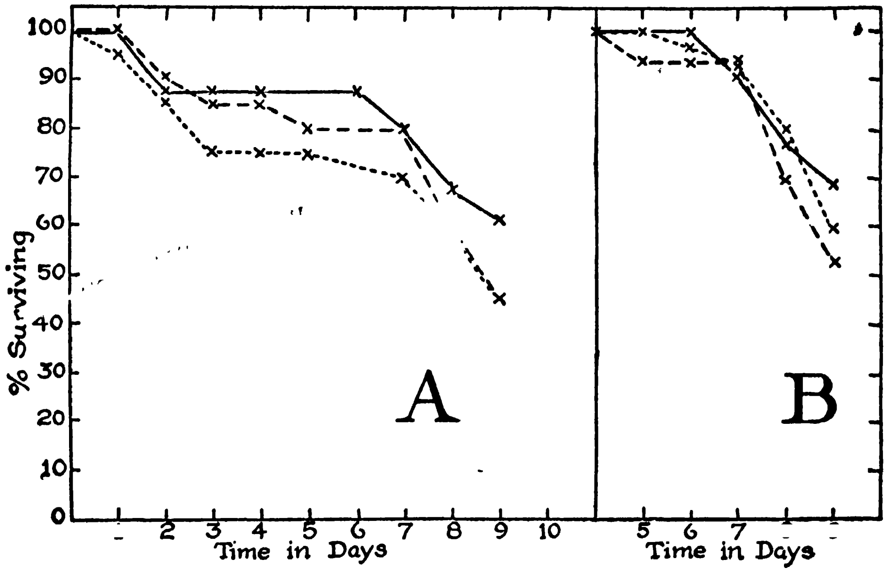

FIGURE 1.—*Graph showing the survival curves obtained from amoebae in three different nonnutrient solutions.* Solid line, curve obtained in solution of M/100,000 SH glutathione in saline; broken line, curve obtained in solution of M/100,000 alanin, M/100,000 glycine, and M/100,000 glutamic acid in saline; dotted line, curve obtained in saline alone. Graph A shows these curves for a period of nine days from the time of transfer of the amoebae to these solutions. Graph B the curves obtained by taking the survivals in each solution at the close of the fourth day as 100 per cent. Graph A shows the total death rates due to shock and starvation. Graph B those due to starvation. The figures for cell volume are in arbitrary units. Actual volumes in cubic millimeters may be obtained by multiplying the given figure by 0.000098

From this graph it will be seen that the positions of the respective curves indicate that the total death rate was greatest in saline, less in the control, and least in the SH glutathione. It will be noted, however, that this difference is largely due to the differences in the deaths during the first three days of the experiment. These deaths are evidently *not* due to starvation, since they precede a period of cessation of death, but must be ascribed to shock of some sort incident to the transfer of the amoebae from the culture. It is then fairly evident that the effect of the solutions as to nutrition can best be judged by comparing the segments of the curves following this period

(roughly over the third and fourth day) during which no deaths occurred in any solution. This was done by taking the survivors in each solution on the fourth day as 100 and plotting survivals in each solution for the following days in percentages as before. The results obtained are given in graph B, Figure 1. It will be at once apparent that the curves obtained are, within experimental error, identical. The curve for the saline, which certainly represents the solution of least nutritional value, lies median to the other two. It is concluded, therefore, that the control and SH glutathione solutions must be considered as contributing nothing to the general nutrition of the cell that would not be as well supplied by a simple saline solution.

This ascertained, the effect of SH glutathione on cell division was taken up. Now, it appeared to us likely that cells that had just divided and cells just about to divide would react differently, in regard to division, to substances introduced into the surrounding medium. It further seemed probable that a given number of small cells would include a majority of cells just divided, and a given number of large cells a majority just about to divide; so that, if the cells were selected according to size, these differences in reaction to a given substance would become evident. We accordingly performed the following three experiments:

In the first experiment 40 large amoebae (volumes approximately between 17 and 30 in arbitrary units) were individually isolated, 20 into glutathione solution and 20 into control solution. In the second experiment, 60 amoebae were selected, 40 large and 20 small. Of these, 20 large amoebae were individually isolated into glutathione and 20 into the control solution, and the 20 small amoebae (volumes approximately from 5 to 13 in arbitrary units) were individually isolated into glutathione for comparison. In the third experiment 120 amoebae were used. Of these, 40 were large in volume, 40 medium (13 to 16 arbitary units), and 40 small. Twenty of each of these lots of 40 were individually isolated into glutathione solution and 20 into control. All solutions in all experiments were buffered to pH 7.0.

In all three experiments daily observations of divisions and deaths were recorded and daily renewals of containers and solutions were made for four days. Then the living amoebae were fixed and their nuclear condition was observed and recorded. The results of the three experiments as to cell division were plotted in terms of per cent division as a function of time, and as to nuclear division as per cent over the total time. (Figs. 2, 3, and 4, respectively.)

In the presentation of the results with respect to cell division, the effect of the death of undivided organisms was allowed for in calculating the percentages, by taking as the basis for each day's calculation the number of living amoebae found at the previous day's count,

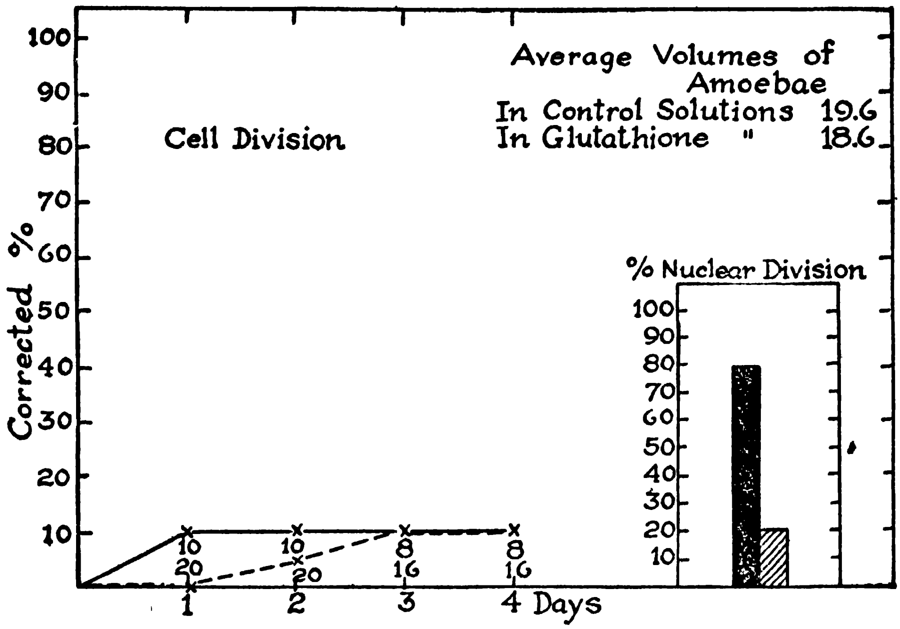

FIGURE 2.—*Graph showing the effect of M/100,000 SH glutathione upon nuclear and cell division of amoebae of large cell volume under survival conditions.* Solid line, curve for cell division obtained in M/100,000 glutathione; broken line, curve for cell division obtained in control solution; ordinates *corrected total* percentage of cell division; solid column, *total* percentage of nuclear division in glutathione solution; shaded column *total* percentage of nuclear division in control solution. The figures for cell volumes are in arbitrary units; these may be converted to actual volumes in cubic millimeters by multiplying the given figure by 0.000098

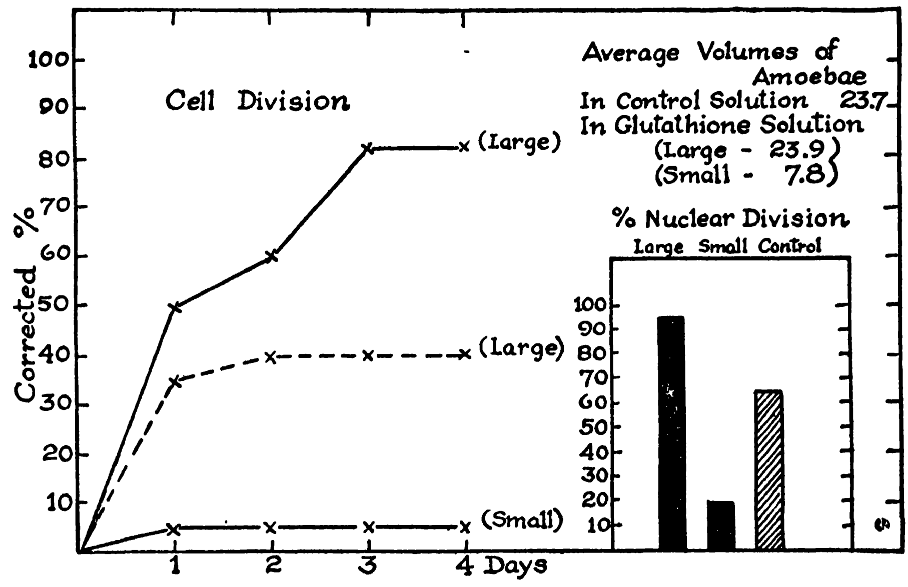

FIGURE 3.—*Graph showing the effect of M/100,000 SH glutathione upon nuclear and cell division in amoebae of large and of small volumes under survival conditions.* Solid line, curves for cell division obtained in glutathione solution; broken line, curve for cell division obtained in control solution; ordinates, *corrected total* percentage of cell division; solid column *total* percentage of nuclear division in glutathione solution; shaded column *total* percentage of nuclear division in control solution. Cell volumes are given in arbitrary units; the actual volumes in cubic millimeters may be obtained by multiplying the given figures by 0.000098

excluding one of the daughter cells in each case of division. The reason for excluding the one daughter cell was that it was considered (and this consideration proved correct) that the chance for a cell to divide twice under the conditions used was almost negligible. On all curves plotted, the number of survivors is given for each day for each point obtained. Thus if it is desired to perform the calculation on some other basis, the data are available.

In respect to nuclear division the basis of calculation is the original number of cells taken. Since the daily observations revealed cell divisions only, nuclear divisions not followed by cytoplasmic division were detected only on fixation on the fourth day. From Figure 2

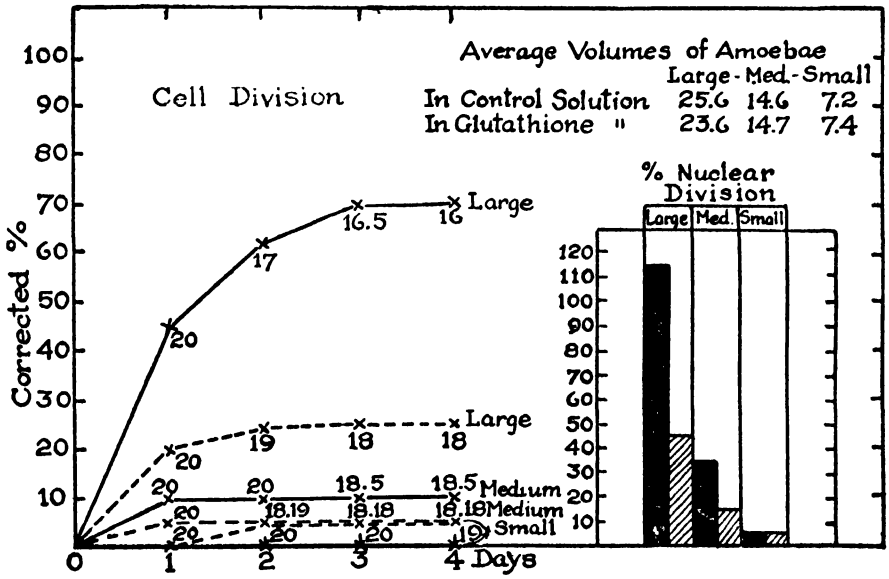

FIGURE 4.—*Graph showing the effect of M/100,000 SH glutathione upon nuclear and cell division in amoebae of large, medium, and small cell volume under survival conditions.* Solid lines, curves for cell division obtained in M/100,000 glutathione solution; broken lines, curves for cell division obtained in control solution; ordinates, *corrected total* percentage of cell division; solid column, *total* percentage of nuclear division in glutathione solution; shaded column, *total* percentage of nuclear division in control solution. The figures for cell volumes are in arbitrary units and may be converted to actual volumes in cubic millimeters by multiplying by 0.000098

it will be noted that in this experiment, which unfortunately was performed during a period when the laboratory temperature was so high (29° to 30° C.) that the cultures available were not in the best of condition, no difference as to cell division occurred between the amoebae in glutathione and those in the control solution; but a very large difference in nuclear division appeared, 80 per cent against 20 per cent, proving a considerable independence of nuclear division with regard to division of the cytoplasm, and indicating that the effect of the SH glutathione is principally upon the former.

From Figure 3, illustrating an experiment performed under more favorable conditions, it will be seen that the cell volume evidently

plays a rôle of great importance. The large amoebae show a significantly greater proportion of division, both nuclear and cell, in the glutathione than in the control solution, whereas the small amoebae exposed to glutathione show a very low percentage of cell and nuclear division.

The relation between cell size and glutathione effect is still more strikingly brought out in the third experiment illustrated by Figure 4, where it will be seen that this effect varies directly with the average volumes of the three groups of cells used.

We conclude, therefore, that exposure of amoebae under survival conditions to SH glutathione in a concentration of M/100,000 at pH 7 0 results in an increase in both nuclear and cell division, which increase tends to vary directly with the volume of the cells so exposed.

It is at this point suggestive to note that in these three experiments in the results obtained with the *large* cells, the per cent of nuclear division occurring in a given solution tends to vary less than the per cent of cell division. The average deviations from the mean values in the solutions are as follows: In the glutathione solutions, for nuclear divisions 10 per cent of the mean, and for cell divisions 52 per cent of the mean; in the controls, for nuclear division 28 per cent of the mean, and for cell division 40 per cent of the mean.

2. THE EFFECT OF REDUCED (SH) GLUTATHIONE AT DIFFERENT HYDROGEN-ION CONCENTRATIONS

It is well known that the rate of oxidation of sulphydril compounds to the corresponding disulphides is a function of the hydrogen ion concentration. Since it has been asserted by Hammett that the sulphydril group is the active factor in acceleration of cell division, it is of interest to ascertain what result changes in hydrogen ion concentration will have in respect to the effect of SH glutathione upon both nuclear and cell division.

To ascertain this, two experiments were performed. Ninety large amoebae were used in each. In lots of 15 these amoebae were individually isolated, one lot into each of three SH glutathione solutions buffered to pH 6.0, 7.0, and 8.1, respectively, and one lot into each of three control solutions similarly buffered. The experiments were each run for a period of four days, and daily observations, renewals of containers and solutions, and final fixations and observations made as in the previous experiments. One of these experiments was performed under more favorable temperature conditions than the other. The results obtained, plotted in the same way as those for the preceding experiments, are presented in Figures 5 and 6.

From these two figures it is at once seen that throughout the range of hydrogen ion concentration used there is once more a marked difference in per cent of *nuclear division* in favor of the amoebae in

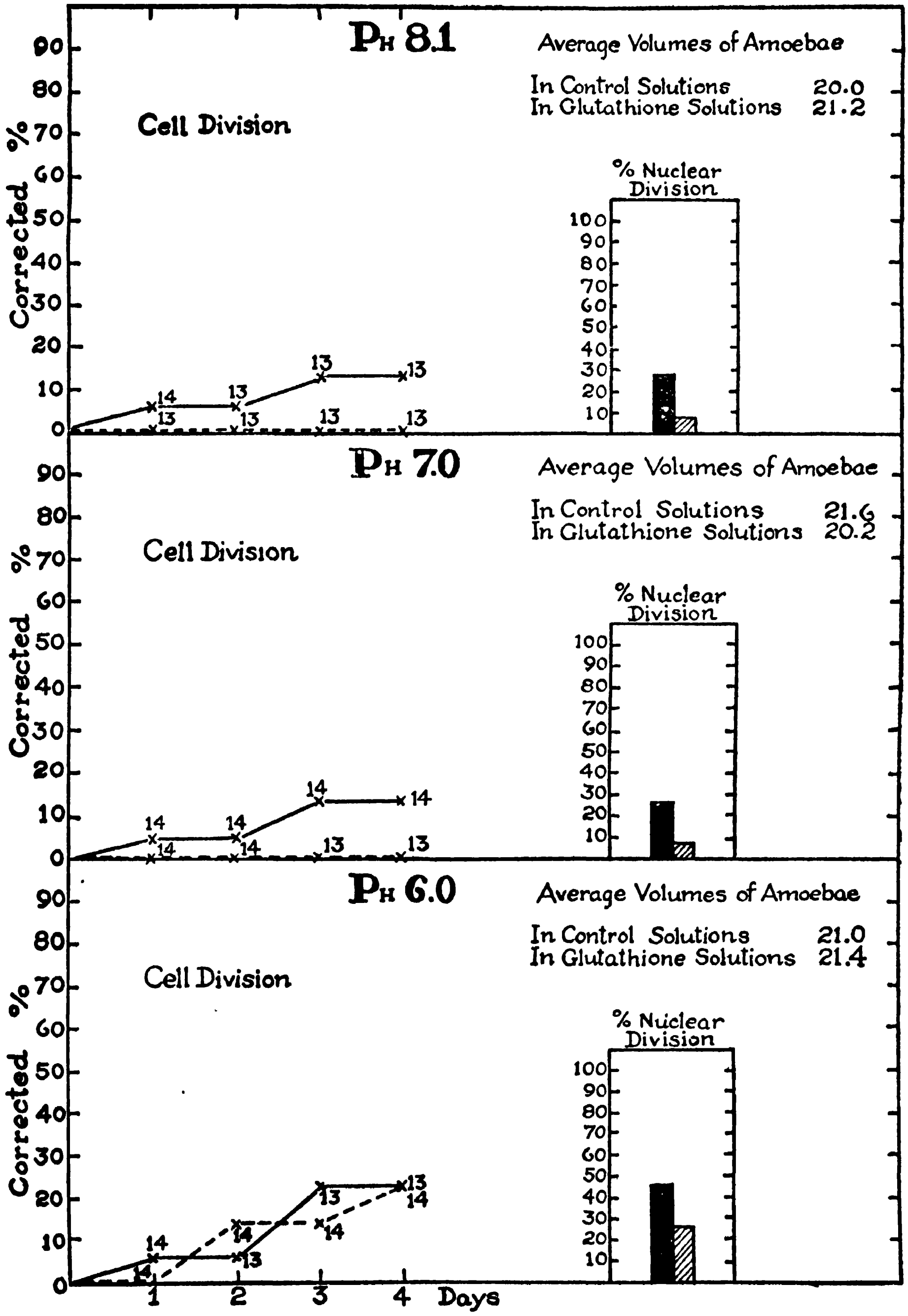

FIGURE 5.—*Graph showing the effect of M/100,000 SH glutathione upon nuclear and cell division in amoebae under survival conditions at different hydrogen ion concentrations* (under unfavorable (27–30° C.) temperature conditions). Solid lines, curves for cell division in glutathione solutions; broken lines, curves obtained in control solutions; ordinates, *corrected total* percentage of cell divisions; solid columns, *total* percentages of nuclear division in glutathione solution; shaded columns, *total* percentages of nuclear division in control solutions. The figures for cell volumes are in arbitrary units and may be converted to actual volumes in cubic millimeters by multiplying by 0.000098

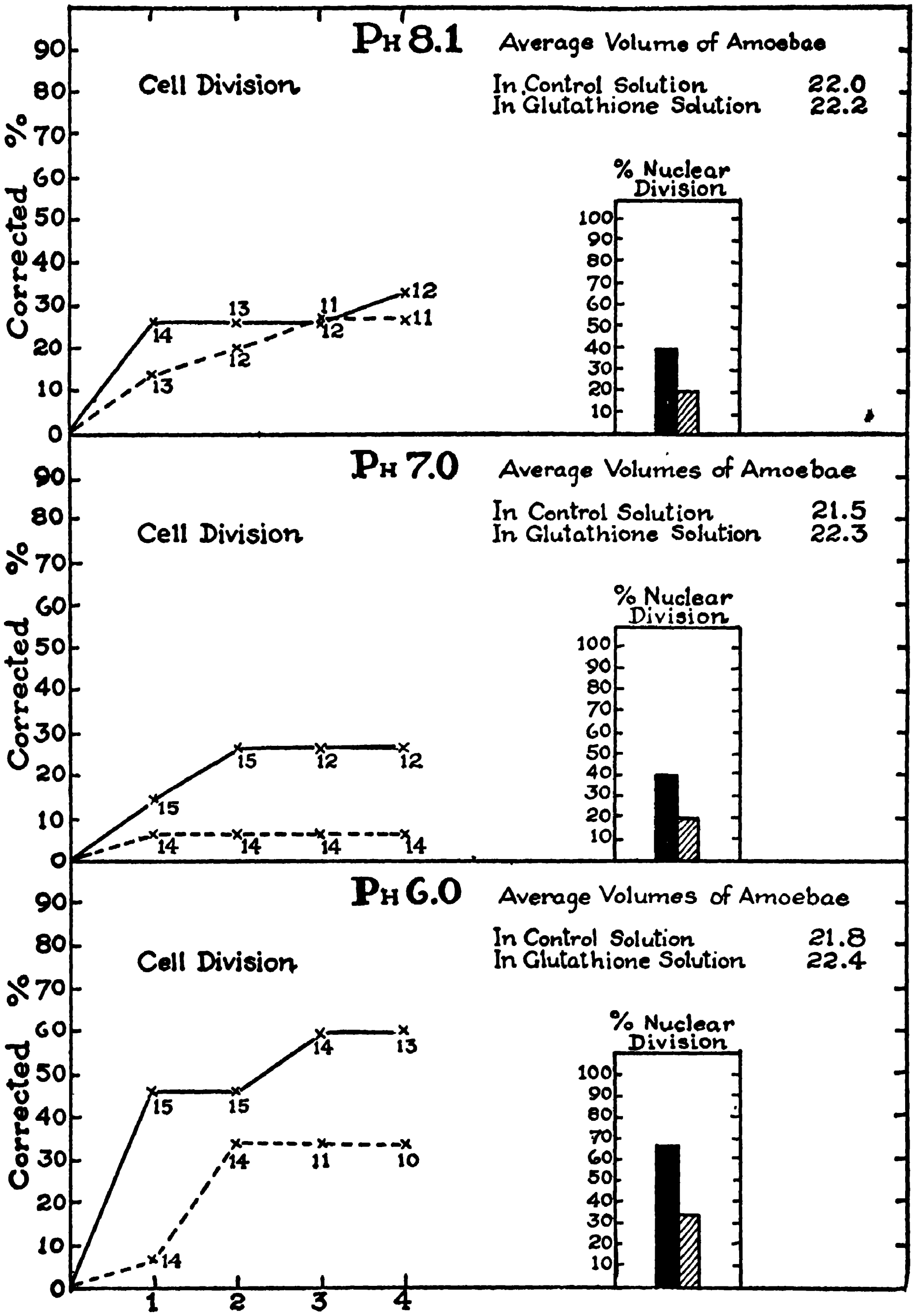

FIGURE 6.—*Graph showing the effect of M/100,000 SH glutathione upon nuclear and cell division in amoebae under survival conditions at different hydrogen ion concentrations* (under favorable (20-24° C.) temperature conditions). Solid lines, curves for cell division obtained in glutathione solutions; broken lines, curves for cell division obtained in control solutions; ordinates, *corrected total* percentages of cell divisions; solid columns, *total* percentages of nuclear division in glutathione solution; shaded columns, *total* percentages of nuclear division in control solutions. The figures for cell volumes are in arbitrary units and may be converted to actual volumes in cubic millimeters by multiplying by 0.000098

the SH glutathione solutions, but that the per cent of division in these solutions is less in both experiments at pH 7.0 and 8.1 than at 6.0. However, the percentage difference in favor of the cells in glutathione as compared with the controls is in one experiment (fig. 6) practically the same throughout the range and in the other (fig. 5) markedly greater at the neutral and alkaline points. This last result probably has little significance in view of the small number of divisions actually found (one in each control solution). With regard to *cell division*, it will be seen that the results given in Figure 5 (which represent those obtained under the unfavorable conditions), indicate only a slight increase of cell division in the glutathione solutions, but that as with nuclear division the per cent is greatest in the solution at pH 6.0. In Figure 6 the same relation appears emphasized, except that there is evident an increase at pH 6.0 and 7.0 in the per cent of cell division in the SH glutathione solution over the control, while at pH 8.1 the per cent of cell division is approximately the same in both solutions. It will be noted that again cell division shows greater variability than nuclear division.

The percentage increase above controls as shown for nuclear division in Figure 6 (which, as it represents the data gathered under the best temperature conditions, is reasonably taken as the more accurate experiment) is practically the same (100 per cent) over the pH range used. Hence it would seem that the results show that no effect due to the hydrogen ion concentration upon the influence of SH glutathione on nuclear division is indicated.

In both figures it will also be noted that there is apparent for all solutions a direct variation of per cent of nuclear and cell division with acidity. This seems to indicate that the hydrogen ion concentration may *per se* exert an effect on nuclear and cell division.

3. THE EFFECT OF OXIDIZED (S–S) GLUTATHIONE

To ascertain more exactly whether an evident difference exists between the effect of the sulphydril and disulphide forms of glutathione, it was decided to test the effect of the disulphide form directly.

For this test two experiments were performed, 40 amoebae being used in each, and in each 20 amoebae were individually isolated into control and 20 into S–S glutathione solutions, both buffered to pH 7.0. Large amoebae were used. The usual procedure as to observation, renewal of solutions, etc., was observed, and the experiments were each conducted over a 4-day period. The results obtained were plotted, as the similar experiments with the SH form of glutathione, and are presented in Figure 7.

From this figure it is at once evident that the results of both experiments show clearly that in the S–S glutathione solution there is a

significant increase in nuclear division over the controls, and that this is also true for cell division. It must be concluded that under the conditions obtaining there is no evidence that any *qualitative* difference results if S–S glutathione is added to the medium instead of SH glutathione.

4. COMBINATION OF RESULTS

The results of the foregoing experiments clearly indicate that glutathione exerts an influence leading to increase in nuclear and cell division in amoeba. However, in order to bring out this effect with more convincing clarity and to eliminate variables, such as cultural

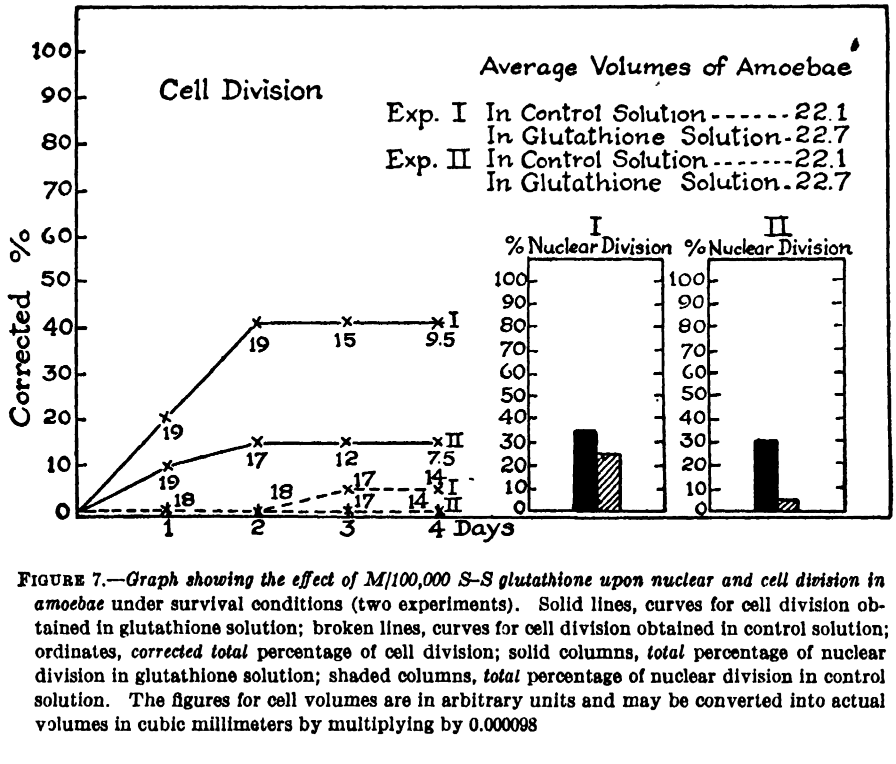

FIGURE 7.—*Graph showing the effect of M/100,000 S–S glutathione upon nuclear and cell division in amoebae* under survival conditions (two experiments). Solid lines, curves for cell division obtained in glutathione solution; broken lines, curves for cell division obtained in control solution; ordinates, *corrected total* percentage of cell division; solid columns, *total* percentage of nuclear division in glutathione solution; shaded columns, *total* percentage of nuclear division in control solution. The figures for cell volumes are in arbitrary units and may be converted into actual volumes in cubic millimeters by multiplying by 0.000098

conditions and temperature, which may have influenced the results of the individual experiments, we combined all results obtained with SH glutathione. They were plotted so as to bring out the relation of the effect of glutathione with respect to cell volume. In doing this the number of amoebae used, that had volumes between 5 and 10, 10 and 15, and so on, were counted and the average volume for each group was ascertained. Then the number of nuclear divisions, cell divisions, and the number of polynuclears at the end of the experiments in each group were counted and expressed as per cent of the total number of amoebae in the group. The results were then plotted, giving these percentages as a function of cell volume. Curves were also plotted giving the average survival, and average divisions per

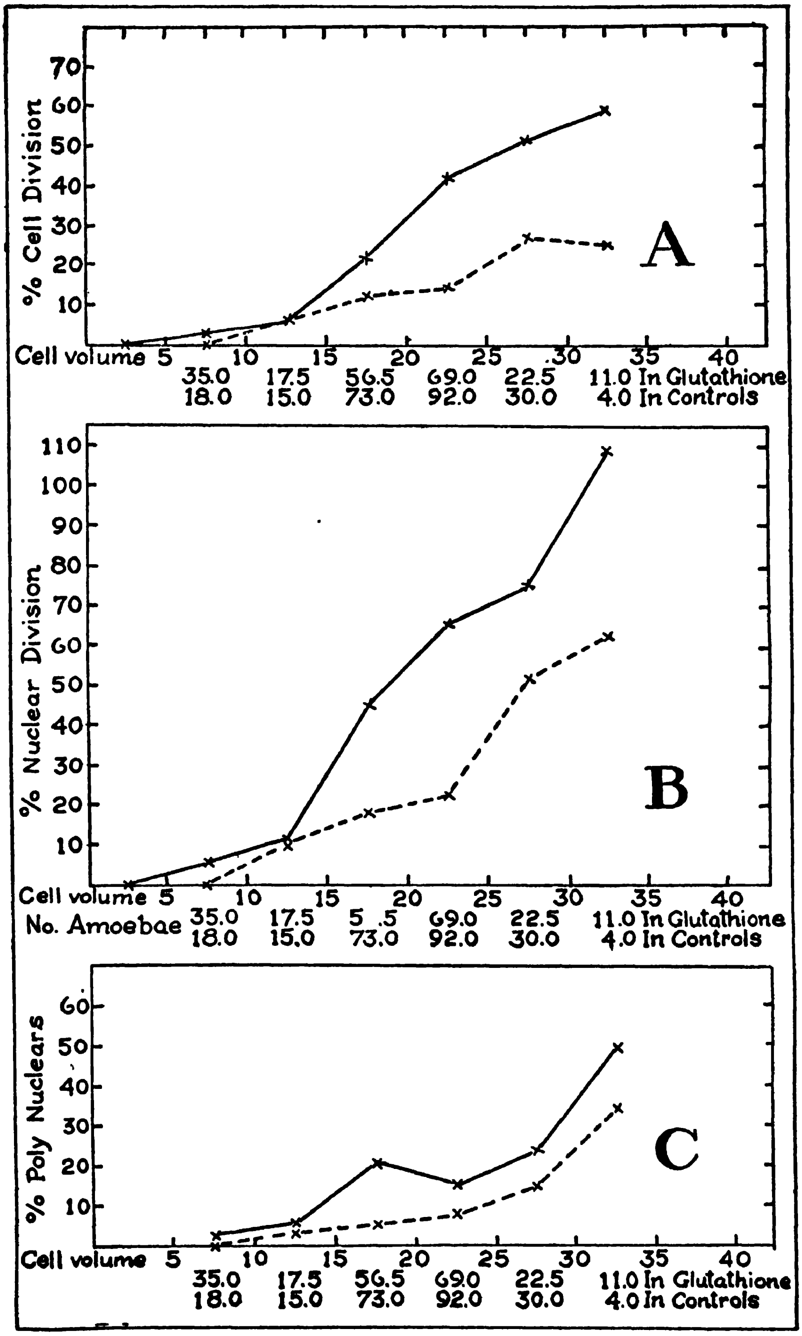

FIGURE 8.—*Graph showing the relations between cell division, nuclear division, the number of polynuclear cells formed in and persisting to the end of a 4-day period, and the volume of the cell in amoebae in M/100,000 SH glutathione and in control solutions* under survival conditions. Solid lines, curves obtained in glutathione solutions; broken lines, curves obtained in control solutions. The figures for cell volume are in arbitrary units and may be converted to actual volumes in cubic millimeters by multiplying by 0.000098

day for the total number of experimental and control organisms. The curves relating, respectively, per cents of cell division, nuclear division, and polynuclear cells found (for both the control and SH glutathione solutions) to cell volume are given in Figure 8, graphs A, B, and C.

From these curves it is at once evident that nuclear and cell division in glutathione and control solution are definitely functions of cell volume, as is also the number of polynuclears that arise and persist during the 3 to 4 day interval covered by our experiments. It will be remembered that all amoebae were mononuclear at the beginning

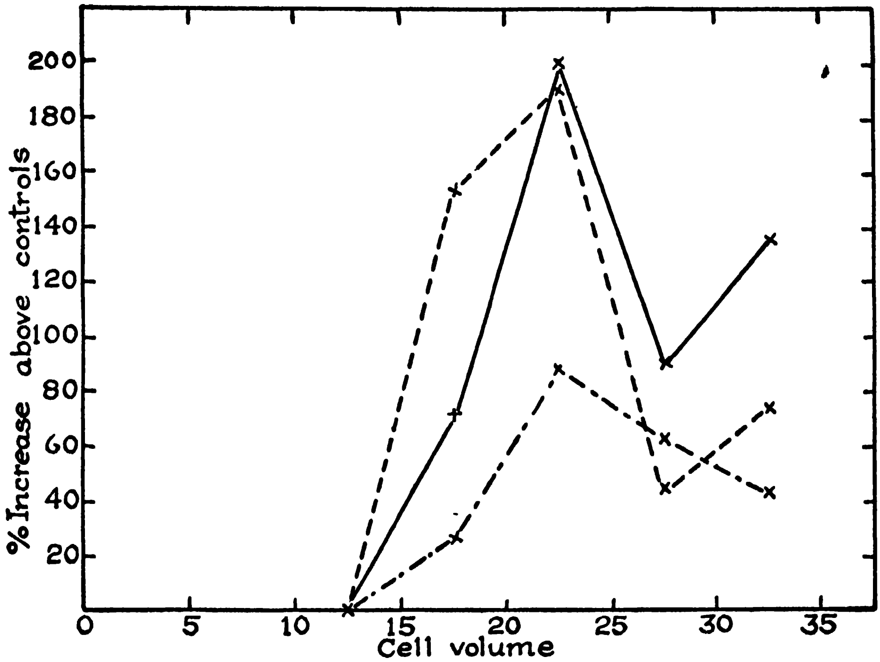

FIGURE 9.—*Graph showing the relation between cell volume and the percentage increase for amoebae in M/100,000 SH glutathione solution over amoebae in control solution in regard to cell division, nuclear division, and in the number of polynuclear cells formed in and persisting to the end of a 4-day period,* under survival conditions. Solid line, curve for increase in cell division; dotted line, curve for increase in nuclear division; dotted and dashed line, curve for increase in polynuclears. The figures for cell volumes are given in arbitrary units and may be converted to actual volumes in cubic millimeters by multiplying by 0.000098

of any experiment. It will be seen that the curves obtained for amoebae under control conditions show a distinct tendency for nuclear division to increase rapidly after a volume between 20 to 25 is reached, and that at this point there is also a rapid increase in per cent of polynuclears. There is also a flattening of the cell division curve at 25 to 30. This, if continued, would indicate that amoebae over 20 to 25 in volume tend to become polynucleate. In fact, it was a difficult matter to find mononucleate amoebae of greater volume than about 24 in our cultures; and, in general, the larger the animals examined, the scarcer became the mononuclears. Variation in this

respect occurs between cultures. The curves obtained for the amoebae in glutathione solution show the same general trend as do those for the control animals, but the increase in nuclear and cell division over the latter is most marked at a volume of 20 to 25. *It is also striking that the effect of SH glutathione is itself a function of cell volume,* and that no effect is evident on cells below the point 10 to 15.

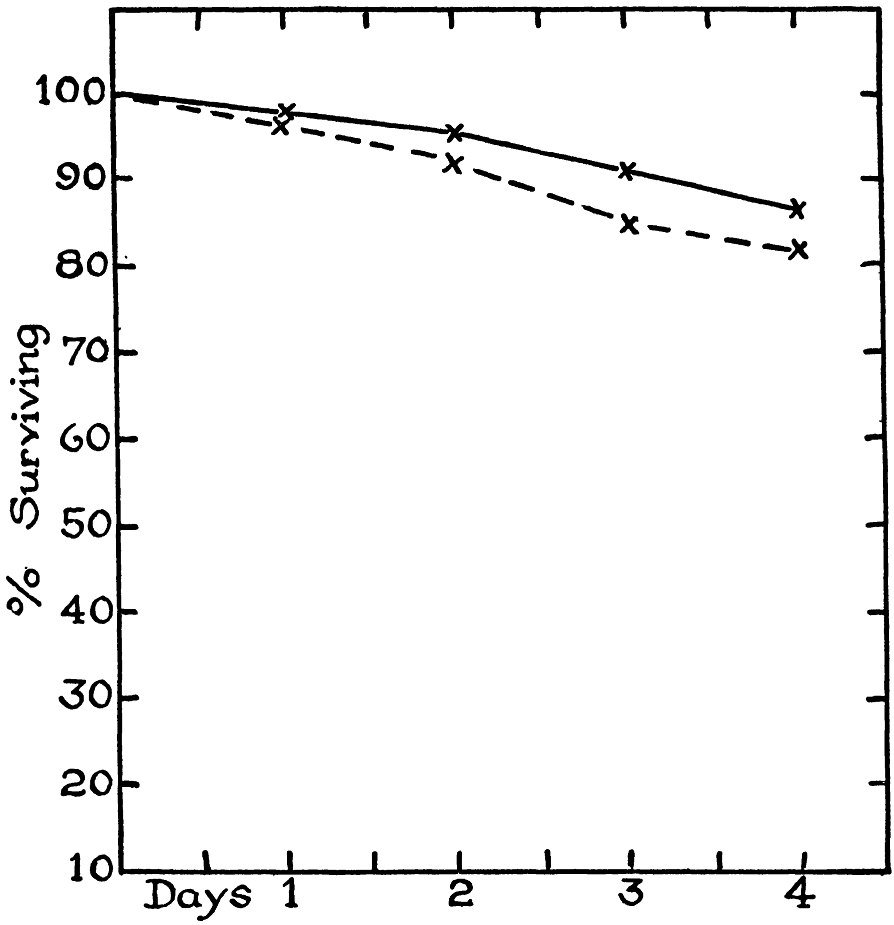

FIGURE 10.—*Graph showing curves of daily per cent survival in M/100,000 SH glutathione and in control solution for all amoebae used.* Solid line, curve obtained in glutathione solutions; broken line, curve obtained in control solutions

Considering that, in general, cell volume must be a function of physiological maturity, we can state that the effects of glutathione are dependent on the physiological maturity of the cell. To define this more accurately, the percentage increase over the controls, due to glutathione, for the three variables, per cent nuclear division, per cent cell division, and per cent of polynuclears, was plotted as a function of cell volume. The results are given in Figure 9. From this it is readily seen that glutathione exerts its greatest effect on cells having a volume of about 20 to 25.

There remains the question as to how far differences in death rates could account for the results obtained. The percentage of the original number of amoebae surviving at the end of each day, in glutathione and control solutions, respectively, is given in Figure 10. It will be seen that, while there is a slight difference in survivals in favor of cells exposed to glutathione, it is probably negligible. This is definitely shown by combining all experiments to give curves like those used for the individual experiments with glutathione on division and allowing for the greater survival in the glutathione solutions, on the basis of the percentage daily survivals given in Figure 10. The compilation of the results on this basis is presented in Figure 11. It will be seen that the average corrected percentage in nuclear division during the four days for all experiments with glutathione solutions is roughly 100 per cent above the average for the controls, after

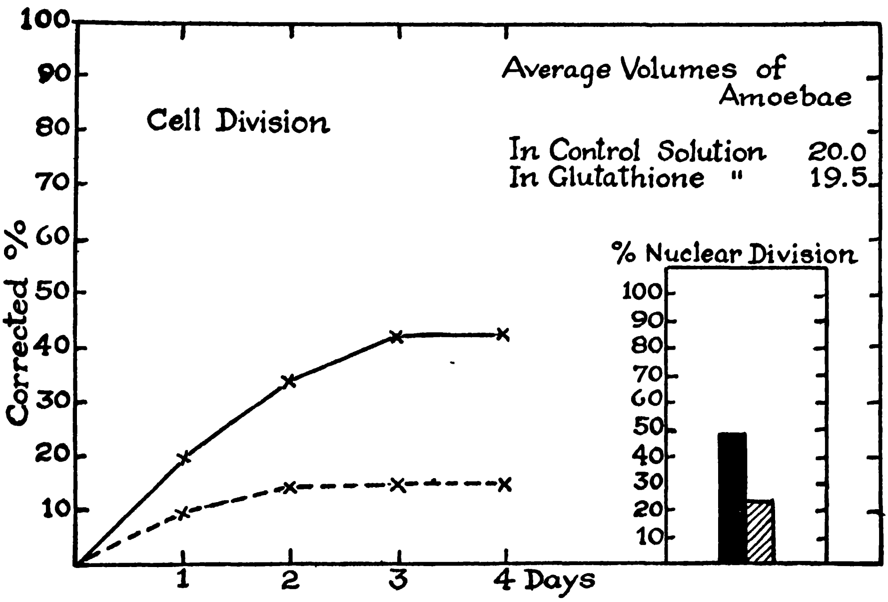

FIGURE 11.—*Graph showing the effect of M/100,000 SH glutathione upon cell and nuclear division in amoebae under survival conditions obtained from the combined results of all experiments with SH glutathione.* Solid line, curve for cell division obtained in glutathone solutions; broken line, curve for cell division obtained in control solutions; ordinates, *corrected total* percentage of cell division; solid column, *total* percentage of nuclear division in the glutathione solutions; shaded column, *total* percentage of nuclear division in control solutions

due allowance is made for deaths; and that cell division shows an increase of 180 per cent above the controls.[1]

General Discussion of Results

The following discussion of the interesting results obtained in this investigation of course applies only to *Amoeba proteus*, studied under the conditions chosen by us for reasons which were mentioned in the

[1] The greater percentage of cell divisions over nuclear divisions is, of course, due to the different basis for calculation, as was previously explained.

introduction. Some of the conclusions to be drawn may have a more general biological significance, but this will have to be confirmed by experiments on other types of cells.

The selection of *Amoeba* as the experimental cell and the choice of survival conditions, instead of conditions under which food is present, have been fortunate. Survival conditions eliminate the uncontrollable nutritional factors, but are somewhat complicated by the low death rate resulting from the transfer of the cells from the culture medium to the solutions used in the experiments. However, the exact chemical reproducibility of these solutions more than compensates for this disadvantage. In fact, we have found in preliminary experiments carried out in the presence of food organisms that such conditions are extremely difficult to control.

The first important result is the clear-cut demonstration that *the process of cell division depends on cell volume,* irrespective of whether the cells are immersed in control or glutathione solution. This is particularly well shown in Figure 8, which is based on a large number of cells. We have already referred to this relationship as indicating that cell division is dependent on cell maturation. In using the term maturation we are fully aware that it is impossible at present to explain it on a chemical and physical basis. However, the much greater chance of a larger cell to exhibit signs of cell division as compared with a very small cell, must indicate that the chemical state (to use a word with broad meaning) of the very small cell and particularly its nucleus differs from that of a larger cell.

The second important point is *the relative independence of nuclear and cytoplasmic division* of the experimental and control animals. This point will be more forcibly brought out in the discussion of the glutathione effect.

The third result indicates, but does not prove, that *the hydrogen ion concentration of the solution may exert an effect on the process of cell division.* It is necessary to point out, however, that it is practically impossible to buffer the solutions at different pH levels without introducing slight variations in the concentration of the different inorganic ions used for their buffer action. Further work is therefore required to establish this important relationship of pH of the medium to cell division.

As to the action of the glutathione, it can be stated without reservation that *glutathione favors the process of cell division,* and it is significant that this action is exerted by such low concentrations of the substance that an ordinary nutritional effect can be ruled out. A further significant fact is that the state of oxidation of the sulphur in the glutathione of the solution in which the cells are immersed apparently does not influence the result. Both SH and S–S glutathione favor the division process. We must emphasize again that

the SH glutathione employed was a beautifully crystalline substance yielding correct S and N figures on analysis, whereas the S–S glutathione was contaminated by small amounts of impurities.

A further important fact is *the much greater effect of SH glutathione on the division of the nucleus than on the cytoplasm of cells of lesser maturity.* (Fig. 9.) This may indicate that the seat of the glutathione action is principally on the nucleus as far as the various parts of the division process of the cell as a whole are concerned. It does not necessarily follow, however, that glutathione does not effect the metabolism of the cytoplasm, but only that cytoplasmic division *per se* is not so markedly influenced by glutathione until the cell reaches a greater state of maturity. We believe that this is the first instance in which a substance is shown to favor more or less specifically the division of the nucleus. This is particularly significant in view of the normal occurrence of glutathione in cells of widely different origin, including also tumor cells.

The action of glutathione clearly depends on the stage of maturation of the cell upon which this substance is allowed to act. It is perfectly obvious that glutathione does not appreciably influence cell division, nuclear division, or the occurrence of polynuclear cells, when amoebae of *very small* cell volume are used. (Fig. 8.) As the cells mature, the glutathione effect upon the division process evidences itself and reaches a maximum for cells of an average volume between 20 and 25 arbitrary units. (Fig. 9.) The state of maturation of the nucleus therefore is a determining factor, as to whether or not exposure of a given cell to glutathione will be followed by nuclear division.

We do not intend in this paper to speculate on the chemical mechanism underlying the action of glutathione on the division process.

Conclusions

A method is described for the study of the influence of chemical substances upon the division of *Amoeba* under conditions which almost completely eliminate the uncontrollable nutritional factors. Using this technique, the following results were obtained:

1. The percentage of occurrence of nuclear divisions and cell divisions and the number of polynuclear cells found at the end of the experiments vary directly with the volume of the cells used. The process of cell division, therefore, depends on the cell volume.

2. The percentage of occurrence of nuclear, and probably of cell division apparently varies directly with the hydrogen ion concentration over the range covered.

3. Exposure of amoebae to SH or S–S glutathione results in more nuclear and cell divisions and more polynucleate cells than in the controls. This is true for nuclear division, and to some extent for cell division, between pH 6.0 and 8.1. However, the percentage

increase in nuclear division in SH glutathione over that in the controls is probably not influenced by the hydrogen ion concentration over the range covered.

4. The percentage increase in nuclear division and cell division and the number of polynuclear cells in SH glutathione solution, as compared with the controls, vary with the volume of the cells used, and reach a maximum in all three, when the cells used are about 0.002 to 0.0025 cubic millimeters in volume.

5. The effect of SH glutathione is much greater on nuclear than on cell division on cells having volumes between about 0.00125 and 0.0022 cubic millimeters. This indicates that glutathione exerts a more marked influence on nuclear division than on cell division on cells of this range of volume (maturity).

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THE BLACKTONGUE PREVENTIVE VALUE OF MINOT'S LIVER EXTRACT

By JOSEPH GOLDBERGER,[a] *Surgeon*, and W. H. SEBRELL, *Passed Assistant Surgeon, United States Public Health Service*

Goldberger, Wheeler, Lillie, and Rogers (1) have shown that dried pig's liver is a good source of the antipellagric vitamin. Minot and his associates (2) have shown that an extract of liver is potent in the treatment of pernicious anemia, and Cohn, Minot, Alles, and Salter (3) present evidence which indicates that the antipellagric vitamin is not responsible for the effectiveness of liver in pernicious anemia. It was, however, considered worth while to investigate the antipellagric activity of Minot's liver extract. Through the courtesy of Dr. George R. Minot we were furnished, by Eli Lilly and Co., with a supply of Minot's liver extract No. 343, which had been tested and found potent in the treatment of pernicious anemia.

The study was carried out on dogs and consisted of both a preventive and a therapeutic test. The animals were taken care of as described in a previous publication from this laboratory (4).

Goldberger and his associates (1, 4) have already demonstrated the relationship between blacktongue of dogs and pellagra of man, and the evidence which they have presented warrants the assumption that both diseases are caused by a lack of the antipellagric vitamin.

EXPERIMENTAL

Goldberger, Wheeler, Lillie, and Rogers (5) have reported, on the basis of six dogs, that our diet No. 268 (Table 1) produced blacktongue in a period which did not exceed 46 days.

TABLE 1.—*Composition of experimental blacktongue-producing diet No. 268* [1]

[Total calories, 2,400]

Article of diet	Quantity	Nutrients		
		Protein	Fat	Carbohydrate
	Grams	*Grams*	*Grams*	*Grams*
Corn meal [2]	400	33.6	18.8	296.0
Cowpeas (*Vigna sinensis*)[3]	50	10.7	.7	30.4
Casein (purified)[4]	95	82.6	.5	
Cottonseed oil	30		30.0	
Cod-liver oil	15		15.0	
Salt mixture [5]	22			
Total nutrients		126.9	65.0	326.4
Nutrients per 1,000 calories		52.9	27.0	136.0

[1] The corn meal and cowpeas (previously coarsely ground) are stirred into water and cooked about 1½ hours. Then the other ingredients are well stirred in, the total weight being brought to 2,400 grams with water (so that 1 gram represents 1 calorie), and the finished mixture served to the dog ad libitum.
[2] Whole maize meal (white) sifted as for human consumption.
[3] The variety known as the California black-eyed pea.
[4] Commercial casein leached for 1 week in daily changes of acidulated water, after McCollum (6).
[5] After Osborne and Mendel (7).

[a] This study was organized prior to the death of Surgeon Joseph Goldberger, on January 17, 1929, and was, in part, carried out under his direction.

As a control on the present experiments, two dogs (Nos. 59 and 125) were placed on diet No. 268. The significant details in regard to each of these animals are as follows:

Dog 59.—Female. Whelped in the laboratory November 4, 1923. Raised on miscellaneous stock diet. Served in two previous experiments but has not had blacktongue. On stock diet from April 11, 1928, to May 15, 1928.

May 15, 1928: Weighs 6.3 kilograms. In good condition; begins test diet No. 268.

September 1: At the end of a period of 108 days presents first signs of an attack of blacktongue, reddening of mucosa of cheeks, floor of mouth, and upper lip.

September 4: Weighs 4.9 kilograms. Further history not relevant.

Dog 125.—Female. Acquired May 25, 1927, between which date and April 11, 1928, served in one experiment and suffered no attack of blacktongue. On stock diet from April 11 to May 15, 1928.

May 15, 1928: Weighs 7.2 kilograms. In good condition; begins test diet No. 268.

July 3: Weighs 7.9 kilograms.

July 7: At the end of a period of 53 days presents first signs of an attack of blacktongue, a reddening of the mucosa of the cheeks, floor of the mouth and left side of the upper lip. Further history not relevant.

Summary.—The two control animals developed blacktongue in 108 and 53 days, respectively. On the basis of the 6 dogs already reported by Goldberger, Wheeler, Lillie, and Rogers (5), and on the two additional controls here reported, our diet No. 268 produced blacktongue within a period which did not exceed 108 days, and in 7 of the 8 animals did not exceed 53 days. It thus appears that the basic diet No. 268 is a potent blacktongue producer.

PREVENTIVE TEST [2]

Five dogs (Nos. 65, 68, 86, 131, and 132) were placed on the basic diet No. 268, plus a daily dose of Minot's liver extract equivalent to 100 grams of fresh liver, given in gelatin capsules. The significant details in regard to each of the experimental animals are as follows:

Dog 65.—Female. Acquired January 28, 1924. Served in several experiments and suffered one attack of blacktongue, which began April 22, 1924. On stock diet from September 7, 1927, to November 16, 1927.

November 15, 1927: Weighs 10 kilograms.

November 16: Discontinues stock diet No. 156; in good condition; begins test diet No. 268 plus Minot's liver extract, in a daily dose equivalent to 100 grams of fresh liver.

May 15, 1928: Weighs 9.1 kilograms.

May 19: Has not shown any evidence of blacktongue. Liver extract discontinued at the end of a period of 185 days. Continues diet No. 268.

July 10: Weighs 9 kilograms.

July 12: 54 days from the date of discontinuing Minot's liver extract showed first signs of an attack of blacktongue, an injection of the floor of the mouth and reddening of the mucosa of the cheeks. Further history not relevant.

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[2] Carried out with the assistance of Surg. L. M. Rogers.

Dog 68.—Female. Whelped in the laboratory November 25, 1923. Served in two experiments and suffered no attack of blacktongue. On stock diet from September 7, 1927, to November 16, 1927.

November 15, 1927: Weighs 9.7 kilograms.

November 16: Begins test diet No. 268, plus a daily supplement of Minot's liver extract equivalent to 100 grams of fresh liver.

May 15, 1928: Weighs 9.5 kilograms.

May 19: At the end of a period of 185 days discontinues liver extract in good condition; no signs of blacktongue at any time; continues diet No. 268.

January 2, 1929: Weighs 9.1 kilograms. At the end of a period of 228 days from discontinuing the Minot's liver extract presents first signs of a beginning attack of blacktongue, an injection of the floor of the mouth. Further history not relevant.

Dog 86.—Female. Whelped in the laboratory October 12, 1924. Served in several experiments and suffered one definite attack of blacktongue, which began January 23, 1927. On stock diet from September 27, 1927, to November 16, 1927.

November 15, 1927: Weighs 9.1 kilograms.

November 16: Begins test diet No. 268 plus a daily dose of Minot's liver extract equivalent to 100 grams of fresh liver.

May 15, 1928: Weighs 10 kilograms.

May 19: At the end of a period of 185 days liver extract discontinued; animal in good condition; no evidence of blacktongue; continues diet No. 268.

July 10: Weighs 9.5 kilograms. At the end of a period of 52 days from discontinuing the liver extract presents first signs of a beginning attack of blacktongue, reddening of the floor of the mouth and a faint reddened band on the mucosa of each side of the upper lip. Further history not relevant.

Dog 131.—Female. Whelped in the laboratory June 28, 1927, and raised on stock diet.

January 3, 1928: Weighs 5.4 kilograms.

January 4: In good condition; begins test diet No. 268 plus daily supplement of Minot's liver extract equivalent to 100 grams of fresh liver.

June 30: Presented slight injection of the floor of the mouth, which lasted one day.

July 10: Weighs 6.9 kilograms.

July 12: At the end of a period of 189 days discontinues experiment; in good condition. Further history not relevant.

Dog 132.—Female. Whelped in the laboratory June 28, 1927, and reared on stock diet.

January 3, 1928: Weighs 7.3 kilograms.

January 4: Begins test diet No. 268 plus a daily supplement of Minot's liver extract equivalent to 100 grams of fresh liver; in good condition.

July 10: Weighs 8.4 kilograms.

July 12: At the end of a period of 189 days discontinues experiment, without having shown any signs of blacktongue; in good condition. Further history not relevant.

Summary.—Five animals were carried on the basic blacktongue producing diet No. 268 plus a daily supplement of Minot's liver extract equivalent to 100 grams of fresh liver, for a period of from 185 to 189 days, without developing blacktongue. One animal (No. 131) presented a fleeting injection of the floor of the mouth 177 days from the beginning of the experiment, which may possibly be an indication

that the quantity of liver extract given was barely enough to maintain the animal. The Minot's liver extract supplement was then discontinued with three of the animals (Nos. 65, 68, and 86) and signs of blacktongue appeared in 54, 228, and 52 days, respectively. The cause of the long delay in onset in the case of dog No. 68 (228 days) is not clear.

CURATIVE TEST

Five dogs (Numbers 150, 182, 189, 192, and 193) were placed on the basic diet No. 268 and allowed to develop blacktongue. After the appearance of the first definite signs of blacktongue a daily dose of Minot's liver extract equivalent to 100 grams of fresh liver was given each animal, in gelatin capsules. The significant details in regard to each of the experimental animals are as follows:

Dog 193.—Female. Acquired June 27, 1929. On stock diet to September 19, 1929.

September 17, 1929: Weighs 6.4 kilograms.

September 19: In good condition; begins test diet No. 268.

February 11, 1930: Weighs 6.5 kilograms.

February 13: 147 days from the beginning of the experiment presents first signs of an attack of blacktongue, a streaky injection of the floor of the month.

February 23: Floor diffusely and intensely reddened, cheeks reddened and covered by thin pseudomembrane, faint blush on the mucosa of each side of the upper lip. Begins daily dose of Minot's liver extract equivalent to 100 grams of fresh liver.

February 24: Temperature 40° C. Condition of mouth worse.

February 27: Found dead at 1.30 p. m. Autopsy; advanced blacktongue and bronchopneumonia.

Dog 182.—Female. Acquired May 2, 1929. On stock diet to September 19, 1929.

September 17, 1929: Weighs 6.8 kilograms.

September 19: In good condition; begins test diet No. 268.

November 5: 47 days from the beginning of the experiment presents first signs of an attack of blacktongue, a diffuse injection of the floor of the mouth, faint reddening of the mucosa of the cheeks, elongated reddened patch on each side of the upper lip over the canine teeth.

November 6: Begins daily dose of a quantity of Minot's liver extract equivalent to 100 grams of fresh liver.

November 17: Mouth normal.

March 25, 1930: Weighs 7.4 kilograms.

March 26: Discontinues experiment in good condition, after a period of 140 days on Minot's liver extract. Has not presented any signs of a recurrence of blacktongue. Further history not relevant.

Dog 192.—Female. Acquired June 27, 1929. On stock diet to September 19, 1929.

September 17: Weighs 9 kilograms.

September 19: In good condition; begins test diet No. 268.

October 19: 30 days from the beginning of the experiment presents first signs of beginning attack of blacktongue, a faint streaky injection of the floor of the mouth.

October 21: Floor of the mouth and soft palate injected; cheeks faintly reddened; reddened patch on each side of the upper lip over the canines. Begins daily dose of liver extract equivalent to 100 grams of fresh liver.

October 26: Mouth normal.

February 9, 1930: Reddened patch on each side of the upper lip over the canine teeth, which slowly faded during the next several days.

March 25: Weighs 9.5 kilograms.

March 26: Discontinues the experiment in good condition, after a period of 156 days on Minot's liver extract.

Dog 189.—Female. Acquired June 27, 1929. On stock diet to September 19, 1929.

September 17: Weighs 9.8 kilograms.

September 19: Begins test diet No. 268 in good condition.

October 15: Weighs 9.8 kilograms. Twenty-six days from the beginning of the experiment presents first signs of an attack of blacktongue, an intense injection of the floor of the mouth.

October 21: Floor of mouth streakily injected, soft palate injected, mucosa of cheeks reddened, reddened patch on each side of the upper lip over the canine teeth. Begins daily dose of liver extract equivalent to 100 grams of fresh liver.

October 28: Mouth normal.

March 25, 1930: Weighs 9.6 kilograms.

March 26: Discontinues experiment in good condition, after a period of 156 days on liver extract. Has not presented any signs of a recurrence of black tongue. Further history not relevant.

Dog 150.—Male. Acquired September 20, 1928, between which date and June 25, 1929, served in one experiment and suffered an attack of blacktongue, which began February 23, 1929. On stock diet for reconditioning from June 25, 1929, to September 19, 1929.

September 17, 1929: Weighs 8 kilograms.

September 19: Begins test diet No. 268 in good condition.

October 15: Weighs 8.8 kilograms.

October 17: Presented first premonitory signs of an attack of black tongue, a faint streaky injection of the floor of the mouth.

October 29: Weighs 8.9 kilograms.

October 30: 41 days from the beginning of the experiment presents first signs of a definite attack of blacktongue, an elongated, reddened patch on each side of the upper lip over the canine teeth. Cheeks and soft palate reddened. Floor of mouth injected. Begins daily dose of Minot's liver extract equivalent to 100 grams of fresh liver.

November 5: Weighs 9 kilograms. Mouth normal.

January 28, 1930: Injection of the floor of the mouth, diffuse reddening of the mucosa of each side of the upper lip.

February 1: Mouth normal.

March 25: Weighs 10.2 kilograms.

March 26: Discontinues experiment in good condition after a period of 147 days on liver extract.

Summary.—All of the animals developed blacktongue in from 26 to 147 days. One animal (No. 193) died in 14 days from the onset of the first signs of blacktongue, after having received liver extract for four days. A complicating bronchopneumonia, revealed at autopsy, and the delay in beginning the liver extract, probably account for the death of this animal. The remaining four animals

promptly recovered from the attack of blacktongue. Two of the animals were maintained in good condition for an additional period of 140 to 156 days. The other two animals (dog No. 192 and dog No. 150) presented what may have been fleeting evidence of a recurrence 111 and 90 days, respectively, from the beginning of the treatment with Minot's liver extract. This may indicate that while the dose of liver extract was sufficiently large to cure the acute attack, it was barely enough to maintain the animals. Goldberger, Wheeler, Lillie, and Rogers (1) have already pointed out that care must be taken in interpreting the curative test in blacktongue on account of the relapsing nature of the disease. However, when a constantly curative effect is produced, such as occurred in this experiment, and is taken in conjunction with a preventive test, the results become of significance.

DISCUSSION AND CONCLUSIONS

It has been shown that dogs on the basic blacktongue-producing diet No. 268 develop signs of blacktongue in a period which only occasionally exceeds 53 days. When Minot's liver extract, in a daily dose equivalent to 100 grams of fresh liver, was given to five dogs on this diet, the occurrence of blacktongue was prevented for a period of at least 185 days. Three of the animals were continued on the basic diet after discontinuing the liver extract; these animals then developed blacktongue in 54, 228, and 52 days, respectively, thus further strengthening the presumption that the delaying effect was due to the liver extract. The same quantity of Minot's liver extract, given daily to dogs that had developed signs of blacktongue on the basic diet No. 268, caused a recession of symptoms in 4 out of 5 dogs and prevented a recurrence, except for possible fleeting signs in 2 animals, for at least 140 days. The period of observation was too short to warrant the statement that blacktongue would not have developed at a later date, and the possibility of fleeting signs of recurrence in two of the dogs may indicate that the quantity given was barely sufficient to maintain the animals.

It appears, however, that Minot's liver extract, given to dogs on a basic blacktongue-producing diet, in a daily dose equivalent to 100 grams of fresh liver, has a very definite delaying effect on the occurrence of symptoms, and when fed to dogs in an attack of blacktongue has a very definite curative effect. The most reasonable explanation for this action seems to be that the liver extract carries the antipellagric vitamin with it. In view of the evidence herein presented, it seems that Minot's liver extract is a fairly good source of the antipellagric vitamin, and given in larger quantity would be of value as a temporary expedient in the treatment of pellagra.

REFERENCES

(1) Goldberger, Wheeler, Lillie, and Rogers: A study of the blacktongue preventive action of 16 foodstuffs, with special reference to the identity of blacktongue of dogs and pellagra of man. Pub. Health Rep., vol. 43, No. 23 (June 8, 1928), pp. 1385–1454. (Reprint No. 1231.)

(2) Minot, Cohn, Murphy, and Lawson: Treatment of pernicious anemia with liver extract—Effect upon the production of immature and mature red blood cells. Am. Jour. Med. Sci., Vol. CLXXV, No. 5 (May, 1928), pp. 599–622.

(3) Cohn, Minot, Alles, and Salter: The nature of the material in liver effective in pernicious anemia. J. Biol. Chem., Vol. LXXVII, No. 2 (May, 1928), pp. 325–358.

(4) Goldberger and Wheeler: Experimental blacktongue of dogs and its relation to pellagra. Pub. Health Rep., vol. 43, No. 4 (Jan. 27, 1928), pp. 172–217. (Reprint No. 1205.)

(5) Goldberger, Wheeler, Lillie, and Rogers: A further study of experimental blacktongue with special reference to the blacktongue preventive in yeast. Pub. Health Rep., vol. 43, No. 12 (Mar. 23, 1928), pp. 657–694. (Reprint No. 1216.)

(6) McCollum, Simmonds, Shipley, and Park: Studies on experimental rickets, etc. Bull. Johns Hopkins Hosp., 1922, vol. 33, p. 298.

(7) Osborne and Mendel: The nutritive value of the wheat kernel, etc. J. Biol. Chem., 1919, vol. 37, p. 572.

COURT DECISION RELATING TO PUBLIC HEALTH

Prevention of pollution of stream used for domestic purposes.—(Utah Supreme Court; Bountiful City *v.* DeLuca et al., 292 P. 194; decided Oct. 10, 1930.) An action was brought by Bountiful City to restrain the defendants from keeping or grazing goats or other livestock within 300 feet on either side of a certain creek, its tributaries, or sources of supply, some of the waters of which were used by the city and its inhabitants for culinary and domestic purposes, and from permitting such animals to drink out of such creek, its tributaries, or sources of supply, and from in any manner contaminating such waters.

Under State statutes, cities of the class of Bountiful City were authorized to construct waterworks within or without their corporate limits, and, for the purpose of maintaining and protecting the same from injury or pollution, their jurisdiction was extended over the territory occupied by such works and over all reservoirs, streams, etc., used in and necessary for the maintenance and operation of such works and over streams and sources from which the water was taken, for 15 miles above the point from which it was taken and for a distance of 300 feet on each side of the stream. Authority was given to enact ordinances and regulations necessary to carry the conferred powers into effect and to prevent pollution of streams from which the inhabitants of the cities derived their water supply. Bountiful City passed an ordinance which defined the watershed area of

the city as the entire area in any canyon above the intake of the city within which water drained into any stream or tributary thereof where such stream was taken by the city into its waterworks system for culinary and domestic purposes. The ordinance made it unlawful for any person to permit any loose cattle, horses, sheep, or other animals to run at large, except where such livestock were more than 300 feet from any stream or source of water supply within the watershed area, or to permit animals to water directly from the stream or to remain in or near or to pollute such stream.

In the instant case the creek involved flowed through the lands of the defendants. Such lands were suitable only for grazing purposes and were not capable of being used for any other purpose. The defendants used their lands for grazing from 300 to 500 goats and were engaged in selling goat's milk and manufacturing cheese and other products from goat's milk.

The judgment of the trial court was in favor of the city, and the defendants appealed. The supreme court stated that the proper disposition of the case involved the question of whether the statute, ordinance, and decree amounted to a taking or deprivation of property without compensation or due process of law. The court came to the conclusion that neither the statute nor the ordinance was "an unreasonable regulation when properly and reasonably applied and enforced." But with respect to the decree, the court's finding was as follows:

> Thus, in so far as the decree restrains the defendants from corralling or bedding or holding their goats or other livestock within the 300-foot limit above the intake of the city, from suffering or permitting any dead animals to be in or near the creek or any tributary thereof whether within the 300-foot limit or beyond it, from in any manner unnecessarily or unreasonably or negligently so using their premises as to cause dung from animals or other refuse to be cast or washed into the creek and which in the exercise of all reasonable care and caution may be avoided or prevented, from suffering or permitting any of their animals above the city's intake to drink directly from the creek or any of its sources of supply, and which in the exercise of all reasonable care and caution may be avoided and prevented, and from in any manner polluting or contaminating any of the waters of the creek or of any of its sources of supply, which, in the making of a proper, reasonable, and necessary use of the lands, and in the exercise of all reasonable care and caution may be avoided and prevented, the judgment is affirmed. In so far as the decree, without compensation, restrains the defendants from grazing their lands within the 300-foot limit under any and all circumstances, though in so doing the defendants do not make any unreasonable, unnecessary, or negligent use of their lands and use all reasonable care and caution to avoid or prevent any pollution or contamination of the waters of the creek or of any of its sources of supply, the judgment is reversed. * * *

DEATHS DURING WEEK ENDED NOVEMBER 22, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended November 22, 1930, and corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

	Week ended Nov. 22, 1930	Corresponding week, 1929
Policies in force	75, 226, 750	75, 155, 310
Number of death claims	14, 232	13, 602
Death claims per 1,000 policies in force, annual rate	9. 9	9. 4

Deaths [1] from all causes in certain large cities of the United States during the week ended November 22, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Nov. 22, 1930				Corresponding week 1929		Death rate [2] for first 47 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (77 cities)	7, 739	11. 8	696	[4] 56	11. 7	678	11. 9	12. 6
Akron	36	7. 4	4	37	8. 5	4	7. 9	9. 4
Albany [5]	38	15. 5	5	103	12. 8	4	14. 8	16. 3
Atlanta	83	16. 2	5	51	15. 9	10	15. 7	16. 0
White	45	-------	2	32	-------	5	-------	-------
Colored	38	(6)	3	86	(6)	5	(6)	(6)
Baltimore [5]	200	13. 0	14	49	13. 4	25	14. 1	14. 6
White	152	-------	10	44	-------	17	-------	-------
Colored	48	(6)	4	64	(6)	8	(6)	(6)
Birmingham	57	11. 5	7	67	12. 2	8	13. 7	15. 9
White	21	-------	1	16	-------	4	-------	-------
Colored	36	(6)	6	147	(6)	4	(6)	(6)
Boston	208	13. 8	23	67	12. 9	17	14. 1	14. 9
Bridgeport	35	12. 4	4	68	11. 7	2	10. 9	12. 0
Buffalo	151	13. 7	16	71	10. 1	9	13. 0	14. 0
Cambridge	28	12. 8	1	20	11. 0	5	11. 8	12. 5
Camden	30	13. 3	5	88	7. 1	2	13. 7	14. 4
Canton	23	11. 3	2	53	9. 0	2	9. 9	11. 2
Chicago [5]	704	10. 8	54	48	11. 5	63	10. 4	11. 3
Cincinnati	138	16. 0	9	53	15. 8	14	15. 7	17. 0
Cleveland	229	13. 2	20	60	11. 2	17	11. 1	12. 4
Columbus	68	12. 2	4	39	12. 7	4	15. 5	14. 8
Dallas	50	11. 7	5	-------	12. 5	7	11. 5	11. 5
White	45	-------	3	-------	-------	7	-------	-------
Colored	14	(6)	2	-------	(6)	0	(6)	(6)
Dayton	34	8. 8	6	90	12. 2	1	10. 7	11. 5
Denver	100	18. 1	12	131	16. 1	6	14. 9	14. 8
Des Moines	33	12. 0	2	37	10. 0	2	11. 7	11. 5
Detroit	273	9. 0	34	52	10. 3	40	9. 3	11. 1
Duluth	25	12. 9	2	54	11. 4	0	11. 5	11. 5
El Paso	38	19. 3	4	-------	13. 5	4	17. 2	19. 5
Erie	31	13. 9	1	22	10. 9	1	11. 2	12. 1
Fall River [7] [5]	18	8. 2	3	69	11. 8	0	11. 7	13. 6
Flint	22	7. 3	1	12	9. 9	8	9. 2	10. 7
Fort Worth	36	11. 6	6	-------	11. 1	4	11. 0	12. 3
White	27	-------	6	-------	-------	2	-------	-------
Colored	9	(6)	0	-------	(6)	2	(6)	(6)
Grand Rapids	20	6. 2	6	90	7. 2	1	10. 1	10. 2
Houston	71	12. 7	6	-------	10. 2	4	12. 2	12. 6
White	44	-------	3	-------	-------	4	-------	-------
Colored	27	(6)	3	-------	(6)	0	(6)	(6)
Indianapolis	99	14. 1	7	53	17. 6	6	14. 5	14. 8
White	86	-------	7	60	-------	6	-------	-------
Colored	13	(6)	0	0	(6)	0	(6)	(6)
Jersey City	72	11. 9	14	121	10. 4	15	11. 4	12. 4
Kansas City, Kans	26	11. 1	1	23	9. 4	1	11. 7	12. 8
White	21	-------	1	28	-------	1	-------	-------
Colored	5	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo	109	14. 4	11	92	13. 9	5	13. 5	13. 9
Knoxville	24	11. 8	3	70	13. 1	5	13. 6	13. 9
White	18	-------	3	78	-------	4	-------	-------
Colored	6	(6)	0	0	(6)	1	(6)	(6)

Footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended November 22, 1930, infant mortality, annual death rate, and comparison, with corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)—Continued

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Nov. 22, 1930				Corresponding week 1929		Death rate [2] for first 47 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Los Angeles	243	10.2	7	21	10.9	18	11.0	11.3
Lowell [7]	23	12.0	4	106	17.5	3	13.4	14.1
Lynn	25	12.7	4	112	7.7	1	10.4	11.1
Memphis	60	12.4	6	71	14.0	3	17.0	18.8
White	33		3	54		3		
Colored	27	(6)	3	101	(6)	0	(6)	(6)
Milwaukee	107	9.8	8	35	9.4	9	9.8	11.0
Minneapolis	93	10.4	10	66	10.2	6	10.7	10.8
Nashville	59	20.9	13	204	17.8	5	17.4	18.7
White	38		13	273		4		
Colored	21	(6)	0	0	(6)	1	(6)	(6)
New Bedford [7]	23	10.6	0	0	12.0	1	10.9	12.1
New Haven	37	11.9	6	92	13.5	1	12.7	13.5
New Orleans	160	18.2	13	72	16.0	10	17.5	17.6
White	96		6	51		2		
Colored	64	(6)	7	113	(6)	8	(6)	(6)
New York	1,297	9.7	107	45	10.2	121	10.7	11.3
Bronx Borough	193	7.9	19	55	7.6	10	7.9	8.2
Brooklyn Borough	409	8.2	33	35	9.3	38	9.7	10.2
Manhattan Borough	543	15.3	43	55	14.6	57	16.0	16.4
Queens Borough	121	5.8	11	44	6.6	12	7.0	7.6
Richmond Borough	31	10.2	1	19	15.5	4	14.0	15.9
Newark, N. J	95	11.1	8	42	11.2	8	12.0	12.6
Oakland	75	13.7	13	161	9.7	1	11.0	11.2
Oklahoma City	38	10.7	2	36	12.1	5	10.8	10.9
Omaha	63	15.3	4	49	15.5	7	13.6	13.6
Paterson	34	12.8	1	17	15.5	4	12.1	13.3
Philadelphia	470	12.5	46	68	12.3	42	12.5	13.1
Pittsburgh	171	13.3	26	92	14.6	34	13.8	14.8
Portland, Oreg	66	11.5	2	25	11.4	1	12.2	12.7
Providence	53	11.0	1	9	11.1	2	12.9	14.5
Richmond	53	15.1	5	73	10.9	7	14.9	16.2
White	31		3	66		4		
Colored	22	(6)	2	85	(6)	3	(6)	(6)
Rochester	71	11.4	4	36	10.8	7	11.8	12.3
St. Louis	227	14.4	13	45	14.5	15	14.1	14.6
St. Paul	53	10.2	4	40	10.1	4	10.1	10.4
Salt Lake City [5]	42	15.6	4	63	13.9	5	12.5	13.0
San Antonio	60	12.2	10		17.9	13	14.4	14.5
San Diego	47	16.4	3	63	12.4	0	14.3	15.0
San Francisco	222	18.4	8	54	14.4	7	13.2	13.0
Schenectady	18	9.8	3	93	9.8	2	11.2	12.1
Seattle	74	10.6	1	10	10.9	6	10.9	11.2
Somerville	12	6.0	2	63	9.1	2	9.7	9.2
Spokane	26	11.7	1	26	12.7	0	12.5	12.7
Springfield, Mass	25	8.7	4	69	13.4	0	12.1	12.7
Syracuse	46	11.5	5	62	7.9	0	11.7	12.8
Tacoma	18	8.8	1	27	7.4	0	12.5	11.7
Toledo	50	8.9	6	55	13.4	9	12.7	13.7
Trenton	39	16.6	6	115	14.9	0	16.6	17.1
Utica	30	15.2	1	28	12.8	1	14.7	15.4
Washington, D. C	149	16.0	23	135	13.0	5	15.2	15.3
White	100		9	79		2		
Colored	49	(6)	14	250	(6)	3	(6)	(6)
Waterbury	17	8.7	2	49	7.3	3	9.3	9.4
Wilmington, Del. [7]	23	11.4	2	48	9.4	5	14.6	13.8
Worcester	57	15.1	7	97	9.9	1	12.7	12.6
Yonkers	25	9.6	1	24	8.7	5	8.1	9.3
Youngstown	45	13.8	2	29	13.3	3	10.4	12.2

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 72 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what condition cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended November 29, 1930, and November 30, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 29, 1930, and November 30, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929
New England States:								
Maine	5	6	1	7	15	6	0	1
New Hampshire	3	4		5		71	0	0
Vermont	3	3				5	0	0
Massachusetts	68	131	3	3	162	91	1	2
Rhode Island	4	17	3		3	2	0	0
Connecticut	9	25	3	1	85	2	1	0
Middle Atlantic States:								
New York	93	173	[1] 15	[1] 11	112	164	11	21
New Jersey	65	182	8	4	120	31	4	4
Pennsylvania	108	171			359	302	12	2
East North Central States:								
Ohio	84	89	18	15	29	361	8	10
Indiana	46	39	6		84	12	5	0
Illinois	179	231	7	16	113	325	6	9
Michigan	77	194	9	6	68	179	6	7
Wisconsin	18	36	25	13	205	508	1	3
West North Central States:								
Minnesota	13	22	2		8	57	2	5
Iowa	9	8			5	78	0	1
Missouri	52	45	2	16	331	12	4	7
North Dakota	6	4			3	10	0	0
South Dakota	6	2			2	6	1	0
Nebraska	19	19	5	5	3	49	0	1
Kansas	15	46	1	3	10	50	0	3
South Atlantic States:								
Delaware	5	7			3		0	0
Maryland [2]	40	32	9	32	8	30	0	2
District of Columbia	3	21			1		0	1
West Virginia	19	39	32	35	27	23	1	0
North Carolina	98	112	4	6	25		2	1
South Carolina	34	35	588	547			1	0
Georgia	11	22	53	53	3	16	1	0
Florida	9	19	2	1	2	5	0	0
East South Central States:								
Kentucky	15	27				135	0	1
Tennessee	23	34	75	82	17	1	1	5
Alabama	70	51	64	67	28	2	0	1
Mississippi	35	41					1	0

[1] New York City only.
[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 29, 1930, and November 30, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929
West South Central States:								
Arkansas	33	20	31	65		1	1	2
Louisiana	34	41	8	28	8	10	2	2
Oklahoma [3]	56	87	27	125	34	14	3	2
Texas	60	115	44	10	1	2	1	1
Mountain States:								
Montana	2	4			5	56	0	2
Idaho		1			1	20	4	1
Wyoming	1	7					0	1
Colorado	17	6			101	7	1	0
New Mexico	10	8		3	24	15	1	1
Arizona	4	20	2	5	100		1	10
Utah [2]	6	2	5	1	2	18	1	3
Pacific States:								
Washington	3	8			6	18	0	5
Oregon	6	10	13	22	29	13	1	4
California	66	73	43	65	188	132	4	7

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929
New England States:								
Maine	2	0	12	42	0	0	9	3
New Hampshire	0	0	8	21	0	0	1	0
Vermont	0	0	1	11	1	1	0	0
Massachusetts	14	2	175	193	0	0	10	2
Rhode Island	0	0	14	17	0	0	0	0
Connecticut	0	0	36	52	0	0	3	3
Middle Atlantic States:								
New York	4	0	380	266	3	16	22	13
New Jersey	1	1	149	121	0	0	5	5
Pennsylvania	1	9	399	347	0	4	30	22
East North Central States:								
Ohio	17	4	470	346	53	176	20	22
Indiana	2	1	145	111	62	113	1	2
Illinois	11	1	245	478	25	82	4	10
Michigan	6	2	25	256	50	36	6	5
Wisconsin	3	0	90	87	7	21	7	52
West North Central States:								
Minnesota	2	0	36	94	2	2	0	5
Iowa	0	1	69	50	10	48	6	7
Missouri	3	0	68	95	6	11	14	2
North Dakota	0	0	16	20	13	11	4	0
South Dakota	1	0	13	9	16	22	3	1
Nebraska	5	0	18	50	33	33	1	0
Kansas	4	0	52	111	12	35	6	3
South Atlantic States:								
Delaware	0	0	9	4	0	0	4	0
Maryland [2]	0	1	68	41	0	0	12	8
District of Columbia	0	0	28	8	0	0	2	0
West Virginia	0	0	87	84	59	9	22	25
North Carolina	1	5	103	94	5	6	8	7
South Carolina	0	0	32	27	1	0	19	8
Georgia	0	3	16	39	0	0	5	1
Florida	0	0	6	10	0	1	2	0
East South Central States:								
Kentucky	2	1	41	73	0	12	10	5
Tennessee	1	2	44	53	1	0	18	19
Alabama	3	0	79	39	1	0	8	4
Mississippi	0	0	31	19	0	0	11	5

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 29, 1930, and November 30, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929	Week ended Nov. 29, 1930	Week ended Nov. 30, 1929
West South Central States:								
Arkansas	2	0	14	42	1	3	29	13
Louisiana	3	3	26	16	2	2	20	11
Oklahoma [3]	0	0	48	54	4	35	24	25
Texas	4	0	27	34	4	16	23	3
Mountain States:								
Montana	1	0	33	43	6	17	1	3
Idaho	0	0	2	10	1	1	1	0
Wyoming	0	0	3	1	0	15	0	0
Colorado	2	0	40	30	6	31	5	0
New Mexico	0	0	1	6	0	1	3	5
Arizona	1	0	1	15	0	0	1	2
Utah [1]	0	0	11	15	3	1	0	1
Pacific States:								
Washington	0	0	37	40	11	62	3	1
Oregon	0	1	26	42	10	10	4	2
California	27	2	96	281	18	27	8	5

[1] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Cerebrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September, 1930										
New Hampshire		11	5				6	8		6
October, 1930										
Colorado	5	50	2		328		23	99	8	33
Montana	3	8	10		5		6	74	6	13
Nevada									3	
Oklahoma [1]	6	245	65	283	30	35	14	145	38	153
Oregon		11	55	4	201		7	54	15	15
South Dakota	2	45	7		15		58	27	77	9
Tennessee	23	257	53	142	40	14	17	248	11	206
Virginia	2	360	827	69	256	32	11	366	18	168
Washington	11	140	14		29		10	208	99	52
Wisconsin	11	95	90		531		65	375	27	35

[1] Exclusive of Oklahoma City and Tulsa

October, 1930

	Cases
Anthrax:	
South Dakota	1
Chicken pox:	
Colorado	222
Montana	187
Nevada	17
Oklahoma [1]	17
Oregon	102
South Dakota	50
Tennessee	43
Virginia	181
Washington	217
Wisconsin	981
Conjunctivitis:	
Oklahoma [1]	1
Diarrhea and dysentery:	
Virginia	478
Dysentery:	
Montana	1
Oklahoma [1]	29
Tennessee	8
Washington	1
German measles:	
Colorado	1
Washington	9
Impetigo contagiosa:	
Colorado	7
Oregon	13
Tennessee	2
Washington	3
Leprosy:	
Colorado	1
Lethargic encephalitis: [2]	
Oregon	1
Washington	3
Wisconsin	2
Mumps:	
Colorado	98
Montana	23
Nevada	99
Oregon	53
South Dakota	3
Tennessee	13
Washington	135
Wisconsin	171
Ophthalmia neonatorum:	
Montana	1
Oklahoma [1]	1
Tennessee	3
Paratyphoid fever:	
Washington	1
Scabies:	
Oklahoma	1
Oregon	12
Washington	17
Septic sore throat:	
Oklahoma [1]	25
Oregon	1
Tennessee	1
Washington	2
Tetanus:	
Oklahoma [1]	1
Tennessee	2
Trachoma:	
Oklahoma [1]	6
South Dakota	4
Tularaemia:	
Montana	[3] 4
Nevada	2
Virginia	4
Undulant fever:	
Oklahoma [1]	2
South Dakota	1
Virginia	1
Washington	1
Wisconsin	8
Vincent's angina:	
Oregon	3
Tennessee	1
Washington	1
Whooping cough:	
Colorado	117
Montana	88
Nevada	16
Oklahoma [1]	36
Oregon	49
South Dakota	9
Tennessee	66
Virginia	182
Washington	93
Wisconsin	580

[1] Exclusive of Oklahoma City and Tulsa.

[2] The 15 cases of lethargic encephalitis published in Public Health Reports dated November 28, 1930, as reported in North Dakota should have been published as reported in New York. No case of this disease was reported in North Dakota during October.

[3] 1 case of tularaemia for June, 1930, included.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 94 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 30,420,000. The estimated population of the 88 cities reporting deaths is more than 29,680,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended November 22, 1930, and November 23, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
45 States	1,917	2,312	
94 cities	595	1,071	1,091
Measles:			
45 States	2,331	2,681	
94 cities	402	322	
Meningococcus meningitis:			
46 States	84	138	
94 cities	41	68	
Poliomyelitis:			
46 States	181	55	
Scarlet fever:			
46 States	3,943	3,835	
94 cities	1,168	1,254	979
Smallpox:			
46 States	457	1,095	
94 cities	20	137	19
Typhoid fever:			
46 States	569	378	
94 cities	90	74	47
Deaths reported			
Influenza and pneumonia:			
88 cities	711	619	
Smallpox:			
88 cities	0	0	

City reports for week ended November 22, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	11	1	0		0	1	2	2
New Hampshire:								
Concord	0	0	0		0	0	0	0
Manchester	0	2	2		0	4	0	0
Nashua	0	0	3		0	0	0	0
Vermont:								
Barre	0	1	0		0	0	0	1
Burlington	1	1	0		0	0	0	0
Massachusetts:								
Boston	73	34	23	3	1	32	7	25
Fall River	15	4	1	1	0	1	0	2
Springfield	20	5	4		0	1	5	2
Worcester	32	6	4		0	1	0	5
Rhode Island:								
Pawtucket	1	2	8		0	0	0	3
Providence	6	10	4	1	0	0	0	7
Connecticut:								
Bridgeport	0	6	0	2	2	0	1	2
Hartford	6	6	1		0	31	0	1
New Haven	3	2	1		0	7	4	2
MIDDLE ATLANTIC								
New York:								
Buffalo	62	18	11		0	5	9	22
New York	159	176	49	14	9	76	22	153
Rochester	11	6	1		0	3	0	6
Syracuse	39	3	1		0	0	0	0
New Jersey:								
Camden	11	8	0		0	34	3	5
Newark	26	18	15	3	0	4	7	5
Trenton	6	3	0		1	0	0	5
Pennsylvania:								
Philadelphia	148	71	17	11	3	34	29	58
Pittsburgh	62	28	19		3	10	12	36
Reading	32	3	1		0	1	28	3
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	29	13	3		3	4	15	9
Cleveland	103	57	11	2	0	3	53	21
Columbus	30	11	8	2	0	1	0	5
Toledo	126	10	7	2	1	4	6	5
Indiana:								
Fort Wayne	9	6	0		0	2	0	4
Indianapolis	39	13	18		0	3	5	8
South Bend	4	2	2		1	1	0	1
Terre Haute	2	2	0		0	1	0	0
Illinois:								
Chicago	151	147	102	7	1	21	55	49
Springfield	0	2	1		0	0	0	3
Michigan:								
Detroit	127	69	45	8	1	4	7	22
Flint	28	5	1		0	4	0	3
Grand Rapids	5	2	0		0	3	0	1

City reports for week ended November 22, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—contd.								
Wisconsin:								
Kenosha	67	2	0	2	0	0	2	1
Madison	42	2	0			0	5	
Milwaukee	133	22	9	3	2	3	42	5
Racine	52	2	0		0	0	1	0
Superior	6	1	0		0	0	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	9	0	1		0	1	3	2
Minneapolis	79	34	5		1	1	8	13
St. Paul	39	15	0		0	0	0	7
Iowa:								
Davenport	8	1	2			0	0	
Des Moines	4	3	0			0	0	
Sioux City	12	2	5			0	2	
Waterloo	19	0	0			3	1	
Missouri:								
Kansas City	44	11	9		1	0	1	13
St. Joseph	2	1	1		0	0	0	4
St. Louis		46						
North Dakota:								
Fargo	13	0	0		0	0	5	0
Grand Forks	0	0	0			0	5	
South Dakota:								
Aberdeen	0	0	0			1	0	
Sioux Falls	0	1	1			0	0	
Nebraska:								
Omaha	10	11	8		0	1	4	6
Kansas:								
Topeka	1	2	2		0	0	0	0
Wichita	2	3	1		0	0	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	2	2	0		0	0	0	0
Maryland:								
Baltimore	40	29	13	10	2	9	6	27
Cumberland	0	0	0		0	0	0	1
Frederick	1	0	2		0	0	1	0
District of Columbia:								
Washington	10	21	14	3	2	6	0	13
Virginia:								
Lynchburg	2	3	2		1	0	2	2
Norfolk	12	3	2		0	0	1	3
Richmond	0	18	15		1	6	0	4
Roanoke	12	4	2		0	1	0	2
West Virginia:								
Charleston	17	2	[1] 2	1	1	1	8	2
Wheeling	11	2	1		0	1	0	1
North Carolina:								
Raleigh	1	3	5		0	0	0	1
Wilmington	2	1	0		0	1	0	0
Winston-Salem	4	4	2		0	0	0	1
South Carolina:								
Charleston	0	0	2	26	1	1	0	3
Columbia	3	1	3		0	1	2	7
Greenville	1	2	0		0	0	0	0
Georgia:								
Atlanta		8						
Brunswick	0	0	0		0	0	0	0
Savannah	0	3	1	2	0	1	0	4
Florida:								
Miami	2	3	4		0	0	0	0
St. Petersburg		1			0			0
Tampa	0	3	7		0	1	1	0

[1] One case nonresident.

City reports for week ended November 22, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	2	0		0	0	0	2
Tennessee:								
Memphis	53	8	19		0	1	0	5
Nashville	0	4	0		2	6	0	5
Alabama:								
Birmingham	7	7	18	2	0	18	0	12
Mobile	1	2	8	1	0	0	0	3
Montgomery	2	2	1	1		0	1	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	2	0			0	0	
Little Rock	5	2	1		0	0	3	1
Louisiana:								
New Orleans	0	15	16	3	4	1	0	10
Shreveport	0	1	0		0	0	0	3
Oklahoma:								
Oklahoma City	0	5	9		0	0	0	6
Texas:								
Dallas	3	18	13	3	1	0	2	6
Fort Worth	11	8	6		1	0	0	4
Galveston	0	1	1		0	0	0	2
Houston	3	9	15		2	0	0	5
San Antonio	0	6	3		3	0	0	5
MOUNTAIN								
Montana:								
Billings	2	0	0		0	0	0	2
Great Falls	10	0	0		0	0	0	0
Helena	6	0	0		0	1	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	4	0	1		0	0	0	0
Colorado:								
Denver	58	12	2		3	0	6	14
Pueblo	1	2	0		1	36	0	0
New Mexico:								
Albuquerque	3	1	0		0	2	0	0
Arizona:								
Phoenix	0	1	0		0	0	0	2
Utah:								
Salt Lake City	26	5	0		3	0	0	3
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	11	5	4			0	8	
Spokane	20	3	0			2	0	
Tacoma	7	4	12		0	1	0	2
Oregon:								
Portland	46	11	2		0	5	5	3
Salem	0	0	1		0	0	0	0
California:								
Los Angeles	29	43	12	23	2	10	17	9
Sacramento	5	3	1		0		19	5
San Francisco		16						

City reports for week ended November 22, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	3	4	0	0	0	0	1	1	0	8	21
New Hampshire:											
Concord	1	0	0	0	0	0	0	0	0	0	7
Manchester	2	3	0	0	0	0	0	0	0	0	10
Nashua	0	0	0	0	0	0	0	0	0	0	
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	2
Burlington	0	0	0	0	0	0	0	0	0	0	6
Massachusetts:											
Boston	57	50	0	0	0	6	2	5	0	18	208
Fall River	2	2	0	0	0	2	0	1	0	5	18
Springfield	6	5	0	0	0	1	0	0	0	1	23
Worcester	10	23	0	0	0	3	0	0	0	2	57
Rhode Island:											
Pawtucket	1	3	0	0	0	1	0	0	0	1	20
Providence	10	3	0	0	0	3	0	0	0	10	53
Connecticut:											
Bridgeport	7	2	0	0	0	3	0	0	0	0	35
Hartford	5	5	0	0	0	2	0	0	0	0	20
New Haven	4	1	0	0	0	0	0	0	0	2	37
MIDDLE ATLANTIC											
New York:											
Buffalo	22	18	0	0	0	7	1	0	0	17	146
New York	111	102	0	0	0	70	16	8	0	125	1,297
Rochester	5	30	0	0	0	6	1	1	0	13	66
Syracuse	8	6	0	0	0	1	0	0	0	3	46
New Jersey:											
Camden	3	2	0	0	0	2	0	0	0	1	30
Newark	13	10	0	0	0	10	1	0	0	21	99
Trenton	4	12	0	0	0	2	0	0	0	1	39
Pennsylvania:											
Philadelphia	68	115	0	0	0	22	5	2	0	31	470
Pittsburgh	34	54	0	0	0	10	0	0	1	2	171
Reading	2	2	0	0	0	2	0	0	0	0	27
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	15	26	0	0	0	6	1	2	1	6	138
Cleveland	29	43	0	0	0	14	1	4	1	15	229
Columbus	10	10	1	0	0	4	0	0	0	0	68
Toledo	12	8	0	1	0	2	1	0	0	1	50
Indiana:											
Fort Wayne	3	0	0	0	0	0	0	1	0	0	21
Indianapolis	14	36	2	0	0	9	0	0	0	13	
South Bend	2	6	0	0	0	0	0	0	0	0	24
Terre Haute	4	2	0	0	0	0	0	1	0	0	11
Illinois:											
Chicago	102	170	1	0	0	33	3	1	0	60	704
Springfield	2	7	0	0	0	0	0	0	0	2	17
Michigan:											
Detroit	79	73	0	0	0	14	2	2	2	39	273
Flint	13	11	0	0	0	1	0	0	0	2	22
Grand Rapids	9	14	0	0	0	0	0	0	0	3	20
Wisconsin:											
Kenosha	2	4	0	0	0	0	0	1	0	3	5
Madison	1	0	0	0			0	0		1	
Milwaukee	19	12	0	0	0	4	0	0	0	34	107
Racine	4	9	0	0	0	0	0	1	0	6	13
Superior	3	1	0	0	0	1	0	2	1	13	14

City reports for week ended November 22, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL											
Minnesota:											
Duluth	9	0	0	0	0	1	0	0	0	1	25
Minneapolis	44	20	0	0	0	1	0	2	0	5	93
St. Paul	21	11	2	0	0	1	0	0	0	11	58
Iowa:											
Davenport	1	1	0	3			0	0		0	
Des Moines	11	9	1	3			0	0		0	33
Sioux City	2	2	0	0			0	4	[1] 1	1	1
Waterloo	3	2	0	0			0	1		3	
Missouri:											
Kansas City	15	9	0	0	0	10	1	0	0	0	109
St. Joseph	3	5	0	0	0	1	0	0	0	0	20
St. Louis	32		1				2				
North Dakota:											
Fargo	3	0	0	0	0	1	0	0	0	1	9
Grand Forks	0	0	1	0			0	0		0	
South Dakota:											
Aberdeen	1	0	0	0			0	0		0	
Sioux Falls	2	0	0	1			0	0		0	8
Nebraska:											
Omaha	5	19	1	10	0	2	0	1	0	4	63
Kansas:											
Topeka	4	0	0	0	0	0	0	0	0	0	6
Wichita	5	4	0	2	0	1	0	0	0	0	22
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	5	0	0	0	0	0	0	0	0	23
Maryland:											
Baltimore	20	26	0	0	0	7	2	7	1	10	200
Cumberland	0	3	0	0	0	1	0	0	0	0	13
Frederick	0	1	0	0	0	0	0	0	0	0	1
District of Columbia:											
Washington	19	37	0	0	0	4	1	1	1	3	149
Virginia:											
Lynchburg	1	1	0	0	0	0	0	0	0	0	9
Norfolk	3	4	0	0	0	1	0	0	0	2	
Richmond	8	7	0	0	0	3	1	1	0	0	42
Roanoke	3	5	0	0	0	0	0	0	0	1	10
West Virginia:											
Charleston	2	1	0	0	0	0	0	2	0	0	36
Wheeling	2	0	0	0	0	1	0	0	0	0	9
North Carolina:											
Raleigh	2	1	0	0	0	2	0	0	0	1	15
Wilmington	1	2	0	0	0	0	0	0	0	1	7
Winston-Salem	2	2	0	0	0	1	0	0	0	0	14
South Carolina:											
Charleston	1	2	0	0	0	3	0	1	0	0	39
Columbia	0	1	0	0	0	1	0	0	0	0	47
Greenville	2	0	0	0	0	0	0	0	0	0	
Georgia:											
Atlanta	6		1				1				
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	1	3		0	0	0	0	1	0	0	33
Florida:											
Miami	2	1	0	0	0	3	0	0	0	0	21
St. Petersburg	0		0		0	0	0		0		6
Tampa	1	1	0	0	0	3	0	0	0	1	16
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	4	0	0	0	1	0	0	0	0	17
Tennessee:											
Memphis	6	10	0	0	0	3	1	2	0	2	60
Nashville	3	2	0	0	0	1	1	0	0	2	59
Alabama:											
Birmingham	6	15	0	0	0	3	1	0	0	0	57
Mobile	0	3	0	0	0	1	0	0	0	0	34
Montgomery	1	1	0	0			0	0		1	

[1] Nonresident.

City reports for week ended November 22, 1930—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0			0	0		0	
Little Rock	2	3	1	0	0	1	0	0	0	0	
Louisiana:											
New Orleans	9	10	0	1	0	16	1	5	1	4	160
Shreveport	2	0	0	0	0	2	1	0	2	1	29
Oklahoma:											
Oklahoma City	3	0	0	8	0	0	0	4	2	0	36
Texas:											
Dallas	7	10	0	0	0	3	1	3	0	5	59
Forth Worth	2	4	0	1	0	2	0	0	0	0	36
Galveston	1	1	0	0	0	1	0	16	1	0	15
Houston	3	2	1	0	0	1	0	0	1	0	71
San Antonio	2	1	0	0	0	9	0	0	0	0	60
MOUNTAIN											
Montana:											
Billings	1	1	0	3	0	0	0	1	0	3	10
Great Falls	1	6	1	1	0	1	0	0	0	0	7
Helena	0	0	0	0	0	0	0	0	0	0	6
Missoula	0	0	0	0	0	0	0	0	0	0	7
Idaho:											
Boise	0	2	0	0	0	0	0	0	0	0	3
Colorado:											
Denver	11	21	0	0	0	11	0	2	0	23	101
Pueblo	1	1	0	1	0	0	0	3	0	0	12
New Mexico:											
Albuquerque	0	1	0	0	0	5	0	0	0	0	9
Arizona:											
Phoenix	2	0	0	0	0	4	0	0	0	0	16
Utah:											
Salt Lake City	4	1	1	0	0	2	1	0	0	8	42
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	1
PACIFIC											
Washington:											
Seattle	9	10	2	0			1	3		16	
Spokane	10	2	3	1			0	0		4	
Tacoma	2	3	1	1	0	0	0	0	0	0	18
Oregon:											
Portland	8	7	4	0	0	2	0	1	0	1	66
Salem	0	0	0	0	0	0	0	0	0	0	
California:											
Los Angeles	30	12	2	0	0	12	1	1	1	11	243
Sacramento	3	4	0	0	0	2	0	0	0	1	28
San Francisco	13		0				1				

City reports for week ended November 22, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	2	2	1	1	0	0	2	7	0
Fall River	1	0	0	0	0	0	0	0	0
Worcester	0	0	0	0	0	0	0	1	0
Connecticut:									
Bridgeport	1	0	0	0	0	0	0	0	0
Hartford	0	0	0	0	0	0	0	1	0
MIDDLE ATLANTIC									
New York:									
New York	2	3	1	0	0	0	3	2	0
Rochester	0	0	0	0	0	0	0	2	0
Syracuse	0	0	0	0	0	0	0	1	1
New Jersey:									
Newark	1	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	4	2	1	0	0	0	0	1	1
Pittsburgh	1	2	0	0	0	0	0	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	1	0	0	0	0	0	0
Cleveland	3	1	0	0	0	0	0	4	0
Columbus	0	0	0	0	0	0	0	0	1
Indiana:									
Indianapolis	0	1	0	0	0	0	0	0	0
Illinois:									
Chicago	2	1	0	0	0	0	1	3	0
Michigan:									
Detroit	3	2	0	0	0	0	1	3	2
Wisconsin:									
Milwaukee	0	0	0	0	0	0	0	2	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	2	1	0	0	0	0	0	0	0
Minneapolis	0	0	0	0	0	0	0	2	2
Iowa:									
Des Moines	0	0	0	0	0	0	0	1	0
Sioux City	[1] 1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	2	2	1	0	1	0	0	5	0
North Dakota:									
Fargo	0	0	0	0	0	0	0	0	1
Nebraska:									
Omaha	3	1	0	0	0	0	0	0	0
Kansas:									
Wichita	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC [3]									
Maryland:									
Baltimore	0	1	0	0	0	0	1	1	0
District of Columbia:									
Washington	1	0	0	0	0	0	0	0	0
Virginia:									
Norfolk	2	0	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston [2]	0	0	0	0	1	0	0	0	0
Columbia	0	1	0	0	0	0	0	0	0

[1] Nonresident.
[2] Dengue, 2 cases at Charleston, S. C.
[3] Typhus fever, 2 cases at Savannah, Ga.

City reports for week ended November 22, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	0	0	0	0	0	0	0	0
Nashville	1	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	2	0	0	0	0	0	0	1	1
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	2	0	0	0	0	0	0	0	0
Shreveport	0	0	0	0	0	1	0	1	0
Oklahoma:									
Oklahoma City	0	0	0	0	0	1	0	0	0
Texas:									
Dallas	0	0	0	0	1	1	0	1	0
Fort Worth	1	0	0	0	0	0	0	0	0
Houston	1	1	0	0	0	2	0	0	0
San Antonio	0	0	0	0	0	0	0	1	0
MOUNTAIN									
Colorado:									
Denver	2	1	0	0	0	0	0	0	1
Arizona:									
Phoenix	0	0	0	0	0	0	0	0	1
Utah:									
Salt Lake	1	0	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	0	1	0	0	0	0	1	0	0

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended November 22, 1930, compared with those for a like period ended November 23, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities October 19 to November 22, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929
98 cities	79	134	91	143	[2] 84	156	91	159	[3] 102	[4] 186
New England	97	110	84	114	[5] 79	119	75	168	113	117
Middle Atlantic	36	86	47	99	35	104	46	112	54	123
East North Central	106	163	131	168	110	195	130	205	125	302
West North Central	65	137	91	160	[6] 75	200	104	165	[7] 89	169
South Atlantic	97	139	106	144	79	125	110	122	[8] 143	135
East South Central	202	185	331	205	243	219	209	232	310	239
West South Central	86	396	108	434	213	480	172	427	183	446
Mountain	60	26	34	17	120	61	26	44	26	[4] 89
Pacific	118	121	78	111	109	97	73	84	[9] 94	60

MEASLES CASE RATES

	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929
98 cities	37	30	61	38	[2] 58	44	93	56	[3] 69	[4] 72
New England	69	29	126	27	[5] 94	20	157	45	164	56
Middle Atlantic	30	21	29	33	35	20	71	26	80	34
East North Central	16	47	18	40	16	68	17	91	31	94
West North Central	140	21	288	52	[6] 275	94	491	50	[7] 17	81
South Atlantic	13	9	18	15	44	9	24	7	[8] 59	24
East South Central	27	21	47	0	94	7	20	14	169	14
West South Central	4	15	0	0	0	4	0	19	4	27
Mountain	137	26	403	244	223	61	300	252	318	[4] 107
Pacific	21	63	28	58	28	113	38	142	[9] 42	280

SCARLET FEVER CASE RATES

	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929
98 cities	123	138	165	155	[2] 172	191	191	205	[3] 200	218
New England	144	162	195	177	[5] 204	276	253	265	217	249
Middle Atlantic	82	75	139	89	140	102	133	135	168	127
East North Central	172	192	220	226	234	295	290	311	266	347
West North Central	114	173	159	160	[6] 137	187	140	139	[7] 199	223
South Atlantic	148	174	152	139	145	167	141	238	[8] 198	163
East South Central	169	109	277	205	331	178	310	157	236	157
West South Central	75	149	71	149	97	152	127	152	101	156
Mountain	163	235	335	226	275	357	378	226	275	[4] 267
Pacific	104	104	54	181	111	176	116	179	[9] 101	261

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930, and 1929, respectively.
[2] Hartford, Conn., and Waterloo, Iowa, not included.
[3] St. Louis, Mo., Atlanta, Ga., and San Francisco, Calif., not included.
[4] Reno, Nev., not included.
[5] Hartford, Conn., not included.
[6] Waterloo, Iowa, not included.
[7] St. Louis, Mo., not included.
[8] Atlanta, Ga., not included.
[9] San Francisco, Calif., not included.

Summary of weekly reports from cities October 19 to November 22, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

SMALLPOX CASE RATES

	Week ended—									
	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929
98 cities	2	10	3	13	[2] 2	9	4	13	[3] 3	[4] 24
New England	0	0	0	0	[5] 0	2	0	25	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	2	12	1	20	4	15	2	22	0	33
West North Central	0	31	19	42	[6] 6	29	21	42	[7] 33	50
South Atlantic	0	0	0	0	0	0	0	0	[8] 0	2
East South Central	0	0	0	14	0	0	0	0	0	0
West South Central	7	0	4	27	7	8	4	4	4	38
Mountain	0	52	9	61	9	17	0	9	43	[4] 71
Pacific	21	51	17	29	7	19	21	31	[9] 7	111

TYPHOID FEVER CASE RATES

	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929
98 cities	18	15	14	11	[2] 11	9	15	8	[3] 15	[4] 13
New England	27	16	4	7	[5] 5	11	22	22	15	11
Middle Atlantic	13	8	10	8	5	8	4	3	5	10
East North Central	5	7	8	6	9	6	5	6	9	9
West North Central	8	6	13	17	[6] 4	12	19	4	[7] 22	12
South Atlantic	37	21	29	13	29	13	31	9	[8] 26	19
East South Central	94	48	115	34	27	21	54	14	13	34
West South Central	26	42	15	19	30	11	93	8	90	34
Mountain	77	200	0	78	17	17	26	44	51	[4] 36
Pacific	19	5	21	2	19	7	12	10	[9] 13	5

INFLUENZA DEATH RATES

	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929
91 cities	5	9	9	11	[5] 9	8	10	9	[10] 10	[4] 8
New England	2	0	2	2	[5] 2	4	4	9	7	4
Middle Atlantic	7	12	9	9	13	8	9	4	8	9
East North Central	3	10	6	9	6	8	9	9	5	6
West North Central	9	3	9	6	3	3	6	3	6	9
South Atlantic	4	4	16	19	9	4	5	11	[8] 16	4
East South Central	7	22	15	30	29	37	44	22	15	30
West South Central	8	20	23	27	15	12	31	31	38	16
Mountain	9	17	17	26	9	0	9	26	60	[4] 9
Pacific	9	3	3	3	9	16	6	9	[9] 10	6

PNEUMONIA DEATH RATES

	Oct. 25, 1930	Oct. 26, 1929	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929
91 cities	89	108	101	105	[5] 104	105	118	98	[10] 120	[4] 101
New England	91	63	95	74	[5] 82	119	104	88	115	88
Middle Atlantic	108	144	115	113	122	115	136	103	140	106
East North Central	53	91	88	101	75	78	86	71	83	96
West North Central	59	72	95	135	86	108	77	120	136	102
South Atlantic	125	112	123	116	139	137	157	107	[8] 137	94
East South Central	96	134	74	157	155	90	214	231	190	254
West South Central	134	86	111	105	119	125	111	121	123	129
Mountain	77	122	163	131	189	131	215	157	163	[4] 107
Pacific	74	44	40	31	52	72	83	85	[9] 76	28

[2] Hartford, Conn., and Waterloo, Iowa, not included.
[3] St. Louis, Mo., Atlanta, Ga., and San Francisco, Calif., not included.
[4] Reno, Nev., not included.
[5] Hartford, Conn., not included.
[6] Waterloo, Iowa, not included.
[7] St. Louis, Mo., not included.
[8] Atlanta, Ga., not included.
[9] San Francisco, Calif., not included.
[10] Atlanta, Ga., and San Francisco, Calif., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended November 22, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended November 22, 1930, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia		1				1
New Brunswick			1	1		1
Quebec				3		17
Ontario		2		6	7	24
Manitoba	1					9
Saskatchewan				1	2	9
Alberta					1	
British Columbia				1		5
Total	1	3	1	12	10	66

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended November 22, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended November 22, 1930, as follows:

Disease	Cases	Disease	Cases
Chicken pox	138	Poliomyelitis	3
Diphtheria and croup	62	Scarlet fever	182
Erysipelas	3	Smallpox	1
German measles	1	Tuberculosis	62
Measles	54	Typhoid fever	17
Mumps	42	Whooping cough	71
Paratyphoid fever	2		

CZECHOSLOVAKIA

Communicable diseases—September, 1930.—During the month of September, 1930, cases of certain communicable diseases were reported in the Republic of Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	15	1	Paratyphoid fever	17	2
Cerebrospinal meningitis	3	1	Puerperal fever	45	22
Diphtheria	2,097	101	Scarlet fever	2,130	45
Dysentery	149	17	Trachoma	145	
Malaria	32		Typhoid fever	843	49

LATVIA

Communicable diseases—September, 1930.—During the month of September, 1930, cases of certain communicable diseases were reported in Latvia as follows:

Disease	Cases	Disease	Cases
Anthrax	1	Poliomyelitis	13
Cerebrospinal meningitis	7	Puerperal fever	7
Diphtheria	62	Scarlet fever	112
Dysentery	1	Tetanus	3
Erysipelas	48	Trachoma	66
Influenza	368	Typhoid fever	136
Lethargic encephalitis	1	Typhus fever	2
Measles	67	Whooping cough	70
Mumps	22		

MEXICO

Vera Cruz—Deaths from certain diseases—Six weeks ended November 15, 1930.—During the six weeks ended November 15, 1930, deaths from certain diseases were reported in Vera Cruz, Mexico, as follows:

Disease	Week ended—					
	Oct. 11, 1930	Oct. 18, 1930	Oct. 25, 1930	Nov. 1, 1930	Nov. 8, 1930	Nov. 15, 1930
Anthrax		1				
Bronchitis		2	3		2	2
Cancer		1		1	1	
Cerebrospinal meningitis			1			
Diphtheria		1				
Gastrointestinal disorders	3	2	3	6	6	4
Hookworm disease		1	3		1	
Locomotor ataxia						1
Malaria	1	1			1	2
Measles	1					
Pneumonia	2	1	4	1		2
Sprue					1	
Syphilis	1				1	
Tetanus		1	2			
Tuberculosis	5	3	4	2	4	2
Whooping cough						1

VIRGIN ISLANDS

Communicable diseases—October, 1930.—During the month of October, 1930, cases of certain communicable diseases were reported in the Virgin Islands as follows:

St. Thomas and St. John:	Cases	St. Croix:	Cases
Chicken pox	1	Gonorrhea	4
Gonorrhea	3	Mumps	2
Syphilis	13	Pellagra	2
		Syphilis	1
		Uncinariasis	1

YUGOSLAVIA

Communicable diseases—October, 1930.—During the month of October, 1930, certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	92	13	Poliomyelitis	6	1
Cerebrospinal meningitis	9	4	Puerperal fever	11	2
Diphtheria and croup	1,402	166	Scarlet fever	1,518	160
Dysentery	171	23	Tetanus	35	15
Leprosy	3	2	Typhoid fever	784	54
Lethargic encephalitis	1		Typhus fever	2	1
Measles	620	2			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29
Afghanistan	C		[1] P	P														
China:																		
Amoy	C						1	1										
	D						1	1										
Canton	C	2	2							1			1					
	D		1															
Shanghai	C				8	4		22	23	5	6	4	1		1			
	D					1	1	1	2			2						
Shensi Province	C							P										
Swatow	C	7		3	1	1												
Tientsin	C			2	1													
India	C	37,102	26,121	42,893	14,249	11,823	13,072	12,407	11,109	10,172								
	D	25,711	13,822	22,358	5,879	5,752	6,409	5,939	5,225	4,808								
Bassein	C					1												
Bombay	C			14			1		1	3	1	11	17	1	1			
	D			8			2		1	2		8	10	6	1			
Calcutta	C	327	220	63	8	10		9	4	4	7	9	7	7	11			
	D	179	128	30	3	3		6	3	4	4	4	4	2	6			
Madras	C			1							2			1				
	D			1							2							
Negapatam	C	1																
	D	1																
Rangoon	C	6	1	1	1	1					1							
	D	4	1	1	1						1							
Tuticorin	C											1				1		
	D											1				1		
India (French):																		
Chandernagor	C	3	1			1				1	2							
	D	2								1								
Karikal	C	3																
	D	3																
Pondicherry	C										1							

India (Portuguese)	C			1		1												
Indo-China (see also table below):																		
Pnompenh	C	40	32	11					1		1		1					
	D	18	22	6														
Saigon and Cholon	C	48	10	5					1	1			1					
	D	23	3	1														
Philippine Islands: [2]																		
Ports—																		
Cebu	C	1	65	9	1	1												
	D		36	8	1	1												
Iloilo	C		29	64	3	4	1	2	1									1
	D		22	56	4	5	2	3	2			2						3
Manila	C			1	16	13	10	4	2	1	2							
	D				5	6	1			1								
Provinces—																		
Antique	C			20	2	25	12	8	12		28							
	D			12	1	14	12	7	8		10							
Bohol	C			138	30	14	4	1										
	D			79	12	6	2											
Bulacan	C	3	4	1	1	2	1			2								
	D	1			1	1				1								
Capiz	C		3	2	1													
	D		2	2														
Cebu	C	355	713	85	1	16	8											
	D	170	303	50	1	6	4											
Iloilo	C	2	309	571	71	60	61	46	18	7	13	12	10	10	4	6	11	21
	D	1	193	376	45	45	35	26	15	6	7	12	7	7	3	6	8	11
La Union	C		1															
Leyte	C	47	1															
	D	19	11															
Masbate	C	10	92	34														
	D	3	35	14														
Misamis, Occidental	C		3															
	D		3															
Negros, Occidental	C	140	568	343	40	43	24	15	8	10	5	5	12	3	19	22	44	38
	D	88	368	237	32	30	20	9	6	5	6	3	12	3	12	14	33	17
Negros, Oriental	C		23	8														
	D		13	4														
Nueva Acija	C		1															
	D		1															
Pampanga	C	2	2		1													
Pangasinan	C		3	1														
	D		2	1														
Rizal	C	1	1															
	D														4			
Samar	C			18			3	1	4			3	6	3	4	3	4	4
	D			16			2		4			3	5	1	4	2	4	4
Sorsogon	C														5			
	D	1	1												4			

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.
[2] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29
Philippine Islands—Continued.																		
Provinces—Continued.																		
Surigao	C			28	1				(1)									
	D			17	2													
Tarlack	C			1														
Siam	C	27	20	3							1	3	3		1			
	D	19	9	2								1	3		1			
Bangkok	C	12	8	1							1	2	1	2				
	D	5	3	1							1	1	1	1				
Songkla	C		10															
	D		6															
On vessel:																		
S. S. Malwa from Shanghai	D							1										
On small boat at Port Cebu, from Bantayan Island	C	1																
	D	1																

Place		April, 1930	May, 1930	June, 1930	July, 1930	August, 1930: 1-10	11-20	21-31	September, 1930: 1-10	11-20	21-30	October, 1930: 1-10	11-20	21-31
Indo-China (French) (see also table above):														
Annam [2]	C	60	23	16	1		3							
Cambodia [2]	C	24	88	144	43	37	22		23	13	2	16		6
Cochin-China [2]	C	48	671	273	46	22	5		9	6	18	14	6	8

[1] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.
[2] Reports incomplete.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		June 1–28, 1930	June 29–July 26, 1930	July 27–Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930 6	13	20	27	October, 1930 4	11	18	25	November, 1930 1	8	15	22
Algeria:																	
Algiers	C		3	7	1	2	6	2	1	1	2	2	5		1		
	D												3				
Constantine	C	1	1												1		
Oran	C		3	4	1	2	3	4		4	4	2	1			1	
	D						1				2	1					
Plague-infected rats			2			10			2			4	1				
Philippeville	C					1			1		1	1	1		1		
Belgian Congo	C		2	2	2	3										1	
	D		2	2		3											
British East Africa (see also table below): Uganda	C	406	228	236	44	40	57	61	65	18	32						
	D	328	213	229	37	39	55	60	65	18	32						
Canary Islands: Las Palmas	D			1													
Ceylon:																	
Colombo	C	1	3	2	2				1	1		1				1	
	D	1	3	2	3				1	1		1				1	
Plague-infected rats		1	1													1	
China:																	
Manchuria—Tungliau and Nungan	C			30			29	P	2								
Shensi	C							P					P				
Dutch East Indies:																	
Batavia and West Java	C	98	84	83	13	14	26	26	22	14	26						
	D	98	84	83	12	14	26	24	22	14	26						
Plague-infected rats		4		1		1	1	1									
Java and Madura	D	202	217	188	55	54	67	84	75	68	95	97	124				
Ecuador (see table below).																	
Egypt:																	
Alexandria	C	19	23	11	3	3	2	2	2	1	3	3	2	1	1	3	
	D	9	10	6	5	1	2		3	1	1	1	3		2	2	
Assiout	C	9	2												3		
	D	3	2												1		
Beni-Suef	C			1													
Dakahlieh	C	1															
Gharbieh	C			3													
	D			1													
Girga	C		1		1												
Minieh	C	10	3														
	D	1															
Port Said	C	2	1	1									1				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930 6	13	20	27	October, 1930 4	11	18	25	November, 1930 1	8	15	22
France:																	
Marseille	C				2	2	1					4	2	1		1	
St. Ouen	C		1														
	D		1														
Gambia	C			4													
	D			4													
Greece (see also table below):																	
Patras	C	1	1														
Pyrgos	C									2							
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats		1															
India	C	240	377	877	593	600	704	600	672	527							
	D	187	256	477	262	291	328	251	289	222							
Bassein	C				1		1							1			
	D				1		2										
Bombay	C	3	1			1			1			1	1				
	D	2	1			1				1		1		1			
Plague-infected rats		26	52	35	12	9	11	15	21	13	16	14	2	9	11		
Madras Presidency	C	39	47	81		47	41	39	41	59	46						
	D	22	31	34		23	13	21	14	32	31						
Rangoon	C	1	2	3	2	1	5	2	2					1			
	D	1	2	2	2	1	4	2	2					1			
Plague-infected rats		1	6	7	2		2	4		1			1				
India (Portuguese)	D			P													
Indo-China (see also table below):																	
Pnompenh	C	6	2	4	2	1			1	1							1
	D	7	2						1	1	1		1				1
Saigon and Cholon	C	2		1		1			1								
	D	1															
Iraq: Baghdad	C	28	18	9					1								
	D	15	7	3					1								
Kwang-Chow-Wan	C	31	4	1													
Madagascar (see also table below): Tamatave	C	1	1	2		1	P			1			3		2		
	D									1			3				
Morocco	C	3	1	15									4		1		
	D	4		2													

Nigeria: Lagos	C	5	1	7	1	1	3	1		3		2	33	1	2	2	
	D	5	1	7	1	1	3	1		3		2		1	2	2	
Plague-infected rats		11	18	8		4	2	4				11	3				
Senegal (see table below).																	
Siam	C			7	3								3	1	1		
	D			6	2								3	1			
Bangkok	C			3													
	D			2													
Nagara Rajsima	C			2		1						1				1	
	D			2		1						1				1	
Syria: Beirut	C	12	9	2	3	2							1		3	1	
Tripolitania	C			2													
Tunisia:																	
Sfax district	C	9	6	1													
Tunis	C	1	5											1		1	
	D	1	1														
Union of Socialist Soviet Republics:																	
Salsk Region	C	2	5	7													
	D	1	4	5													
Stavropol Region	C	1															
	D	1															
Union of South Africa:																	
Cape Province	C	1	1	1				1									
	D		1	1			1										
Orange Free State	C				1		1										
	D				1		1										

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	107	97	87	53	50
Ecuador: Guayaquil	C	0	0				
	D	0	0				
Plague-infected rats		0	0				
Greece (see also table above)	C		1				
Indo-China (see also table above)	C		11	1	2	4	
Madagascar (see also table above):							
Ambositra Province	C	1					
	D	1					
Antisirabe Province	C	19	3	24	11		
	D	19	3	24	11		
Miarinarivo Province	C	5	1	1	2		
	D	5	1	1	2		
Moramanga Province	C	1	3		27		
	D		3		27		

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
Madagascar (see also table above)—Con.							
Tananarive Province	C	15	16	28	39		
	D	14	16	28	38		
Senegal:							
Baol [1]	C	13	2	62	79	48	53
	D	11	2	48	20	23	35
Dakar [1]	C	52	53	140	108	3	
	D	42	117	122	90	8	
Louga [1]	C	54	60	138	75	61	37
	D	27	21	103	33	30	25
Thies [1]	C	21	52	54	34	12	24
	D	8	35	30	20	4	15
Tivaouane [1]	C	135	43	119	110	20	53
	D	69	28	70	54	14	31

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930 6	13	20	27	October, 1930 4	11	18	25	November, 1930 1	8	15	22
Algeria:																		
Algiers	C	3		1	3													
Constantine	C		1	1												1		
Arabia: Aden	C			1														
Bolivia: La Paz.[1]																		
British East Africa (see also table below):																		
Tanganyika	C	409	1,610	168	242	198	288		36	27	43	4	21	3				
	D	70	301	42	37	4	55		1	1		1	4	1				
British South Africa:																		
Northern Rhodesia	C	59																
	D	9																
Southern Rhodesia	C	155	79	31	1	1				14	39	98						
	D	13																
Canada:																		
Alberta	C			5	1				1		13	8	1					1
British Columbia—Vancouver	C	4	2	6	6			1	1	1			1		3			
Manitoba	C	10	4			1												
Ontario	C	82	47	24	20	2	2	6		1		3	15		20	9		7
North Bay	C	1																
Ottawa	C	25	15	13	7	2	1	2						14		9	14	
Toronto	C	4	4	1				1										
Quebec	C		4	3	5													1
Montreal	C				7													
Saskatchewan	C	39	22	5	8			1			3				2			2
Regina	C	4																
China:																		
Changking	C	P	1	P	P	P	P	P	P	P	P	P	P	P				
Foochow	C	P	P	P	P		P		P		P							
Hong Kong	C	12	4	2														
	D	9	3	1														
Manchuria—																		
Harbin	C	20	4	3	2													
Kwantung—Dairen	C	8	16	8														
	D	4	1															
Nanking	C	P	P	P	P	P	P	P	P	P	P	P	P	P				

Shanghai—																		
Foreigners only	C	2	5	4	3			18					1	1		1		
Including natives	D	5	3					2									1	
Swatow	D	6	4	1	4	1	1			1			3	1	1			
Tientsin	C	1								1								
Chosen (see table below).																		
Colombia:																		
Barranquilla	C				2													
Buenaventura	C	4	6	10	2													
Cali	D										1		1					
Costa Rica:																		
Port Limon	C	2	2															
San Jose	C	2																
Curacao (alastrim)	C	2	1	2	1													
Dutch East Indies:																		
Borneo	C	16	12	2														
	D	1	1															
Java—																		
Batavia and West Java	C	12	13	8	12	2	5	2	2	10	2	1						
	D	7	3	5	5	2		1	1	1	1	1						
East Java and Madura	C			1														
Sanggi Islands	C	26		11	36	14												
	D	5		3	2	3												
Egypt: Port Said	C	1		3														
France (see table below).																		
Great Britain:																		
England and Wales	C	1,417	926	529	344	99	106	75	61	82	74	44	125	86	87	92	107	
Ashton under Lyne	C	17	7	8														
Bradford	C	2		1							1	1	1	1	1			
Cardiff	C			2										1				
Leeds	C			1										1			2	
London	C	637	498	250	178	43	44	36	41	30	34	23	33	29	32	41	47	
London and Great Towns	C	1,078	753	408	285	79	84	51	54	55	56	32	80	52	58	68	82	
	D											1			1			
Stoke-on-Trent	C	62	32	9	2			1	1			1			1			
Scotland	C		4	1			5											
	D			1														
Honduras: Naco	C							5										
India	C	22,835	12,962	7,630	4,877	830	940	610	751	611	528							
	D	5,451	3,531	2,348	1,240	202	209	119	150	202	122							
Bombay	C	218	113	50	12	2	1	1	2			1						
	D	161	79	33	10	2	1	2										
Calcutta	C	302	161	73	25	1	5	3	2	3	4	3	2	2	4	3		
	D	258	146	76	21	3	4	1	1	3	4	3	1	2	2	3		
Cochin	C	37	16	6	14	1	1		1			8	4	3	5	10		
	D	8	4			1						1		1				
Karachi	C	14	7	1	4			1	3									
	D	4	3		3				2									
Madras	C	72	35	49	38	9	11	6	8	4	4	8	3	2	1	2		
	D	15	10	12	11	1	1	1	3	1	2	3	2			2		

[1] From Jan. 1 to May 31, 1930, 44 deaths from smallpox were reported in La Paz, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22
India—Continued.																		
Moulmein	C	89	21	18	2	1												
	D	21	7	1	1			1										
Negapatam	C	1	2	4	4	1	2		6	4	2	5	3	2	2	2		
Rangoon	C	6	9		3								2			5		
	D	1	2															
Tuticorin	C	5	1										1					
Vizagapatam	C	5	1									1						
India (French):																		
Chandernagor	C	24	19	4				1	2			3			3			
	D	7	3	3			1	1				1			1			
Karikal	C	12	11	2	9		5			1								
	D	3	8	2	9		2			1								
Pondicherry Province	C	40	23	26	22	11	7	7	10	11	10	6	11	1	2			
	D	36	23	25	22	11	7	7	8	11	8	6	11	1	2			
India (Portuguese)	C	47	28	1	9	1	2		1									
	D	8	10	1	2													
Indo-China (see also table below):																		
Pnompenh	C	3		1								2						
	D		1	1	1													
Saigon and Cholon	C	3	1		1	1									2			
	D	2			3	1									2			
Iraq:																		
Baghdad	C	1	1	3	1				1		2							
	D	1		1	1													
Mossoul Liwa	C	21	4	67						63		4	2			6		7
	D	3	1	20						27								1
Ivory Coast (see table below).																		
Jamaica (alastrim)	C	2																
Macao	D	1																
Mexico (see also table below):																		
Jalisco (State) Guadalajara	D	7	15	4	1						2		1	1		1	1	1
Juarez	C		6		2													
	D		1		1					1				1				

Mexico City and surrounding territory	C	80	77	37	10	7	2	1	2	1	3	5	4	1				
	D	32	17	8	6	1	1	1	2			1	2	1				
Progreso	C	1																
	D	1	1															
Vera Cruz	C														1			
Morocco (see table below).																		
Nigeria: Lagos	C		1															
Poland	C	3	2												3			
Portugal:																		
Lisbon	C	8	10	13	50	7	8		12	4	5		7	12			8	
Oporto	C				1													
Siam	C	2		6							1							
	D			3														
Somaliland, British: Boales	C										1					1		
	D										1							
Spain	C		12	5	2		4	1						14	5	11		
Straits Settlements	C	11	9	11	8	1	2	2	1	1	1	1	2	3	3	4		
	D	3	2	3	3		1					1			1	1		
Sudan (Anglo-Egyptian)	C	19	67	12	42	102	5	20	1	25	1	56		3			2	
	D	2	3	1	3	50	2			2		5					1	
Sudan (French) (see table below).																		
Switzerland: Berne Canton	C			1	2					1								
Syria (see table below).																		
Taiwan: Taihoku (see table below).																		
Tunisia: Tunis	C	2	2	1					2									
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P		P			P	P	P			P	P					
Orange Free State	C			P	P													
Transvaal	C				P	P	P	P	P	P		P	P					
Upper Volta	C	1	13															
On vessel:																		
S. S. Naldera, at Port Said	C	1																
S. S. Manoa, from Honolulu to San Francisco	C			1														

Place		April, 1930	May, 1930	June, 1930	July, 1930	August, 1930			September, 1930			October, 1930		
						1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (see also table above)	C	261	305	213	238	59	34		54	52	86	32	62	164
Ivory Coast	C													4
Sudan (French)	C	521	274	76	34			39		P			17	
	D	36	32	18				3					2	
Syria: Beirut	C	19	7	7	2	1								
Taiwan: Taihoku	C	12												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	142	186		424	
Uganda	C	78					
	D	69					
Chosen	C	107		3	2		
	D	35					
Seishin	C	2	1	2			
	D	1					

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
France	C	51		1			
Mexico: Durango (see also table above)	D	4	3	3	3	2	
Morocco	C	18	5	3	8	1	4
Turkey	C	16					

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15
Algeria:																	
Algiers	C	15	3	6	2		3									1	
Constantine Department	C	6	12	2	3						2			1			
Oran	C	3	4	3	1	1						1	2				
Bolivia: La Paz.[1]																	
Brazil: Porto Alegre	C	1															
Bulgaria	C	6	16	10	1		2	2		2		1	3			1	
	D	2	1	1													
China:																	
Manchuria—Harbin (see also table below)	C	13	8	2	2	2											
Shanghai	C				1												
Chosen (see table below).																	
Czechoslovakia (see table below).																	

Egypt:																	
Alexandria	C		1	1	1		1	1	1	1							
Beheira Province	C	49	45	15					1								
	D	13	4	2													
Cairo	C				7			1									
Port Said	C				4		1				1			1			
Great Britain: Scotland—																	
Dunfermline	C			1													
Glasgow	C	1															
	D	1															
Greece (see table below).																	
Ireland:																	
Irish Free State—																	
Galway County—Oughterard	C			2													
Leitrim County—Mohill	C		9	1													
Mayo County—																	
Ballina	C	2	1	1													
Castlebar	C				1												
Swinford	C	14															
Westport	C			2	1												
Roscommon County—																	
Roscommon	C			1													
Strokestown	C			1													
Wicklow County—Shillelagh	C		4	2													
Latvia (see table below).																	
Lithuania (see table below).																	
Mexico:																	
Durango	D								1	1		1					
Mexico City, including municipalities in Federal District	C	6	9	5	9	2	2	3				3	5	1			
	D	3	1		2		1	1				2		1			
Morocco	C	11	15	11	8		2							1		1	1
	D												1				
Palestine	C	2	2	6	3		1	1	1		1	1	1				
Poland	C	171	117	36	34	2	3	6	12	3	6	6	7	7	8	15	7
	D	5	11	4	3		1			1			1				
Portugal: Oporto	C				1						1	1	1		2	1	1
Rumania	C	227	58	28	9	1		1	2	3	4		6				
	D	35	5	8	2												
Spain	C		3	3				1				1	1			4	
	D			1				1				1	1				
Tunisia	C	6	18	24	10	1	1		4	1	1	1	9				
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P				
Municipality of East London	C			1					2			1					
Natal	C	P	P	1	P			P			P	P	2				
Orange Free State	C	P	P	P	P	P	P	P	P								
Transvaal	C			P	P	P	P	P	P	P	P	P	P				
Yugoslavia (see table below).																	

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
China: Harbin (see also table above)	C	240		14	5		
Chosen: Seoul	C	43	2	3	2	1	
Czechoslovakia	C	12	1		1		
Greece: Athens	C	3	3	6	6	4	
Latvia	C	3	3	3	1	2	
Lithuania	C	27	16	18	7	24	1
	D				1	2	
Turkey	C	16	2	7	2		
Yugoslavia	C	16	6				
	D	1					

YELLOW FEVER

	Cases
Brazil:	
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold coast.	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

×

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

VOL. 45 DECEMBER 19, 1930 NO. 51

EXPERIMENTAL STUDIES OF WATER PURIFICATION

V. Prechlorination in Relation to the Efficiency of Water Filtration Processes[1]

By H. W. STREETER, *Sanitary Engineer*, and C. T. WRIGHT, *Technical Assistant in Sanitary Engineering, United States Public Health Service*

During the past few years the chlorination of water as a preliminary stage of filtration treatment, commonly termed "prechlorination," has been attracting considerable attention in this country both as an auxiliary method for reinforcing filtration plants against overburden due to excessive raw water pollution and as a possible means of effecting economies in the use of coagulants. In a review of progress in water chlorination published in 1928, Enslow [2] described the results recently obtained from this method of treatment in 14 North American cities, thus indicating the extent to which it has become established in routine practice during the past few years.

In this connection it may be of interest to note that the use of prechlorination dates back to the original applications made of chlorine in large-scale water disinfection. In 1904 Houston and McGowan who are credited with being the originators of this method of water treatment on a plant scale, added chlorine, in the form of sodium hypochlorite, to the raw water supplying the Lincoln filters, in the London water system. In 1908 Johnson, who was the American pioneer in water chlorination, added chlorine, as calcium hypochlorite, to the raw water of the Bubbly Creek filters at Chicago.

With the rapid and widespread extension of water chlorination which followed the work of these investigators, the practice of adding chlorine to water prior to filtration treatment became supplanted to a large extent, in the United States, by that of postchlorination, or chlorination after filtration, which in ordinary cases proved to be the more economical and readily controlled method. As early as 1914 it was reported by Longley [3] that this latter method was being followed at over half of the plants surveyed by his committee. At the present

[1] Presented at the annual meeting of the American Water Works Association, St. Louis, Mo., June 5, 1930.

[2] Enslow, L. H.: Progress in Chlorination of Water. Jour. Am. Water Wks. Assoc., vol. 20, No. 6 (Dec. 1928), pp. 819–846.

[3] Report of Committee on Water Supplies. Sanitary Engineering Section, American Public Health Association, 1914.

time it has become virtually a universal practice in connection with filtration, regardless of the kind or extent of preliminary treatment used prior to filtration.

The revival of prechlorination as a measure of reinforcement for overburdened filtration plants already equipped with postfilter chlorination, thus introducing double-stage chlorination into current water purification practice, has brought this method quite naturally into comparison with other elaborations of ordinary filtration processes such as double-stage coagulation, sedimentation, or filtration. In view of this development and of the fact that most of the tests of the efficacy of prechlorination quite necessarily have been made by comparison of the performance of individual filtration plants over two different periods, one preceding and the other following the institution of this practice, it appeared that a parallel comparative test, covering a single period, of the results obtained from identical treatment of the same raw water, both with and without prechlorination, might afford a more direct index of the extent of improvement in efficiency accomplished by this measure.

Facilities for making such a test were available at a fully equipped experimental water filtration plant of the rapid sand type installed by the United States Public Health Service at Cincinnati in 1924, primarily for another purpose, [4] but well adapted for controlled parallel observations of the character indicated. The prechlorination experiments were made over a period of 16 months extending from July, 1927, to October, 1928, inclusive. In this paper [5] it is proposed to discuss briefly some of the more significant results of these experiments.

DESCRIPTION OF EXPERIMENTS

The experimental plant, which has been fully described elsewhere,[6] was arranged so that it could be operated in two parallel and duplicate sections, as shown diagramatically in Figure 1. In operating the plant for these experiments, the raw water was divided as it left the head tank, approximately one half of it flowing through one section of the plant and one half through the other section. The water flowing through the two sections was given as nearly as possible the same rapid sand filtration treatment, except that the portion flowing through the section designated as "A" in the chart was prechlorinated at the point indicated, just before passing into the sedimentation basin, but shortly after the addition of the coagulant.[7] As the nominal period of reten-

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[4] See Reprints Nos. 1114 and 1170 from the Public Health Reports, issues of Oct. 1, 1926, and July 15, 1927.

[5] The present paper is the fifth of a series dealing with the result of experimental studies of the efficiency of water purification processes conducted at the experimental plant above designated. For the preceding paper of the series see Public Heal'h Reports for July 4 and 11, 1930, pp. 1521-36 and 1597-1623, respectively.

[6] Reprint No. 1114, Public Health Reports (Oct. 1, 1926), pp. 1-9.

[7] It was not practicable to prechlorinate the raw water prior to the addition of the coagulant, though the interval of time between the addition of the coagulant and prechlorination was very little more than one minute.

tion in the basin was 6 hours, this period represented the time of contact of chlorine with the prechlorinated water before it passed to filter A. The effluents of both filters, A and B, were chlorinated as they passed from each filter into a separate well, where the water was stored for a nominal period of about 20 minutes before being discharged into the final effluent pipe.

After the first month, which constituted a trial period, the plant was operated for 12 months (August, 1927, to July, 1928, inclusive) with the residual chlorine content of the prechlorinated water, as applied to the filters, held within an upper limit of 0.05 p.p.m. during the greater part of the time. During the last three months of the test, this residual was increased gradually up to a maximum of 1.2 p.p.m. in order to observe the effect of heavy prechlorination on the efficiency of filtration. Throughout the entire test period an effort was made to adjust the postchlorination dosage so as to leave a final residual chlorine in the effluent of each filter not exceeding 0.05 p.p.m., an amount falling below the ordinary taste-producing minimum. During the period of heavy prechlorination the final residual chlorine exceeded 0.05 p.p.m. on several occasions, but at no time did it average more than 0.10 p.p.m. for a given day. The coagulant dosage was regulated in accordance with the usual practice and a particular effort was made to maintain the same dosage in the prechlorinated and nonprechlorinated water.

In order to maintain a close check on the residual chlorine content of the water at the various stages of treatment, tests were made hourly at each stage throughout the period of the experiments. Samples of water for physical, chemical, and bacteriological examination were collected at each step of treatment, at 8-hour intervals throughout the day and night, with more frequent collections occasionally as required.

RESULTS OF EXPERIMENTS

Period averages.—The results of the experiments have been compiled in a series of tables and illustrative charts, to be presented in connection with the text which follows. In Figures 2 and 3, based on the data given in Table 1, are two block diagrams showing the comparative average numbers of plate-growing bacteria and *B. coli* observed at each stage of treatment, with and without prechlorination, during successive months of the experiment. For convenient reference, the corresponding average amounts of residual chlorine carried in the prechlorinated water after coagulation-sedimentation and in both filter effluents after postchlorination, have been added to the table and plotted in the chart.

TABLE 1.—*Monthly average numbers of bacteria and amounts of residual chlorine observed at various stages of treatment, with and without raw water prechlorination*

A = raw water prechlorinated
B = raw water not prechlorinated

Month	Average bacterial count per c. c., 24 hours, 37° C.							Average B. coli index per 100 c. c.							Average residual Cl, p. p. m.		
	Raw	Applied		Filtered		Postchlorinated		Raw	Applied		Filtered		Postchlorinated		Applied, A	Postchlorinated	
		A	B	A	B	A	B		A	B	A	B	A	B		A	B
1927																	
July	16,700	201	2,960	150	265	------	------	28,000	206	7,020	20	212	------	------	------	------	------
August	16,200	518	2,580	166	235	------	------	35,000	387	3,710	28	113	------	------	------	------	------
September	37,600	588	10,400	252	646	66	116	52,500	1,100	22,200	50	417	5.2	13	0.06	0.04	0.04
October	17,800	188	6,560	118	313	39	43	49,400	471	8,770	29	251	2.2	10	.07	.05	.02
November	6,960	130	1,230	5.9	32	3.8	8.6	26,500	325	4,240	6.5	18	2.7	3.3	.02	.05	.05
December	6,060	122	389	.8	17.6	.6	3.2	16,100	12	1,190	.5	5.3	0.0	.1	.02	.03	.04
1928																	
January	1,960	78	139	1.5	.8	.5	.4	23,000	70	922	.2	2.7	0.0	.5	.01	.05	.05
February	1,410	77	171	1.4	6.0	.8	.8	12,400	17	1,310	.4	38	.2	.5	.02	.05	.05
March	1,070	61	164	.6	2.2	.4	.5	16,600	64	1,870	2.2	14	.1	.8	.02	.06	.05
April	1,690	63	147	.3	1.6	.03	.07	11,500	44	1,060	.1	5.1	.6	.2	.02	.06	.05
May	1,730	61	414	5.8	21.5	.3	.4	18,700	56	2,800	1.0	55	.6	2.4	.03	.05	.05
June	5,360	95	374	9.7	22.1	1.4	2	28,800	148	3,190	4.2	36	.3	2.1	.02	.04	.04
July	6,870	27	629	24	115	14	15	36,500	39	1,600	.6	130	.6	1.1	.07	.06	.04
August	10,400	1.9	1,310	24	171	15	11	36,000	.3	3,390	3.3	84	2.5	3.7	.36	.06	.05
September	10,600	.5	2,000	9.9	150	8.6	2.4	43,200	.2	8,690	.4	80	1.1	.5	.77	.08	.06
October	18,700	12.2	6,760	3.6	680	4.1	1.9	53,500	1.5	29,500	.2	394	.4	4.4	.33	.08	.06

The table and the charts show a consistent improvement in the bacterial quality of all of the effluents, applied, filtered, and chlorinated, resulting from prechlorination, except in August and September, 1928, when both the plate-growing bacteria and *B. coli* showed an increase in average numbers in the prechlorinated water passing through filter A. As this observed increase occurred only during the period of heavy prechlorination, it can be accounted for only as being due to a marked disturbance in the normal efficiency of filtration resulting from contact of the filter with water containing relatively high amounts of residual chlorine. During the following month, October, the efficiency of this filter was regained, to a considerable extent, in spite of the continued high residual chlorine in the applied

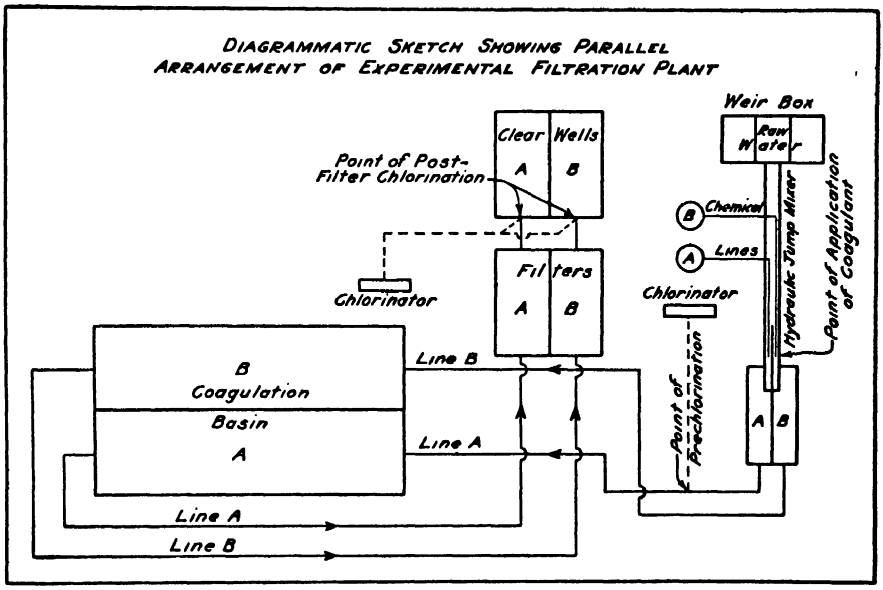

FIGURE 1.—Diagrammatic sketch showing parallel arrangement of experimental filtration plant and points of application of chemicals

water, possibly owing to the adjustment of the filter to a condition of increased tolerance for water of high chlorine content. The behavior of this filter prior to and during the period indicated afforded evidence that the bacterial efficiency of rapid sand filters is intimately associated with biological conditions prevailing in the filtering medium. Particularly significant in this connection was the marked increase in the *B. coli* content of the effluent of filter A during August, the first month of heavy prechlorination, both as compared with the corresponding numbers of this class of organisms observed in the applied water during the same month and as compared with their numbers in the filtered effluent during the preceding month. This increase, if not due to actual multiplication, as seems hardly likely, probably resulted from a progressive "sloughing" of *B. coli* pre-

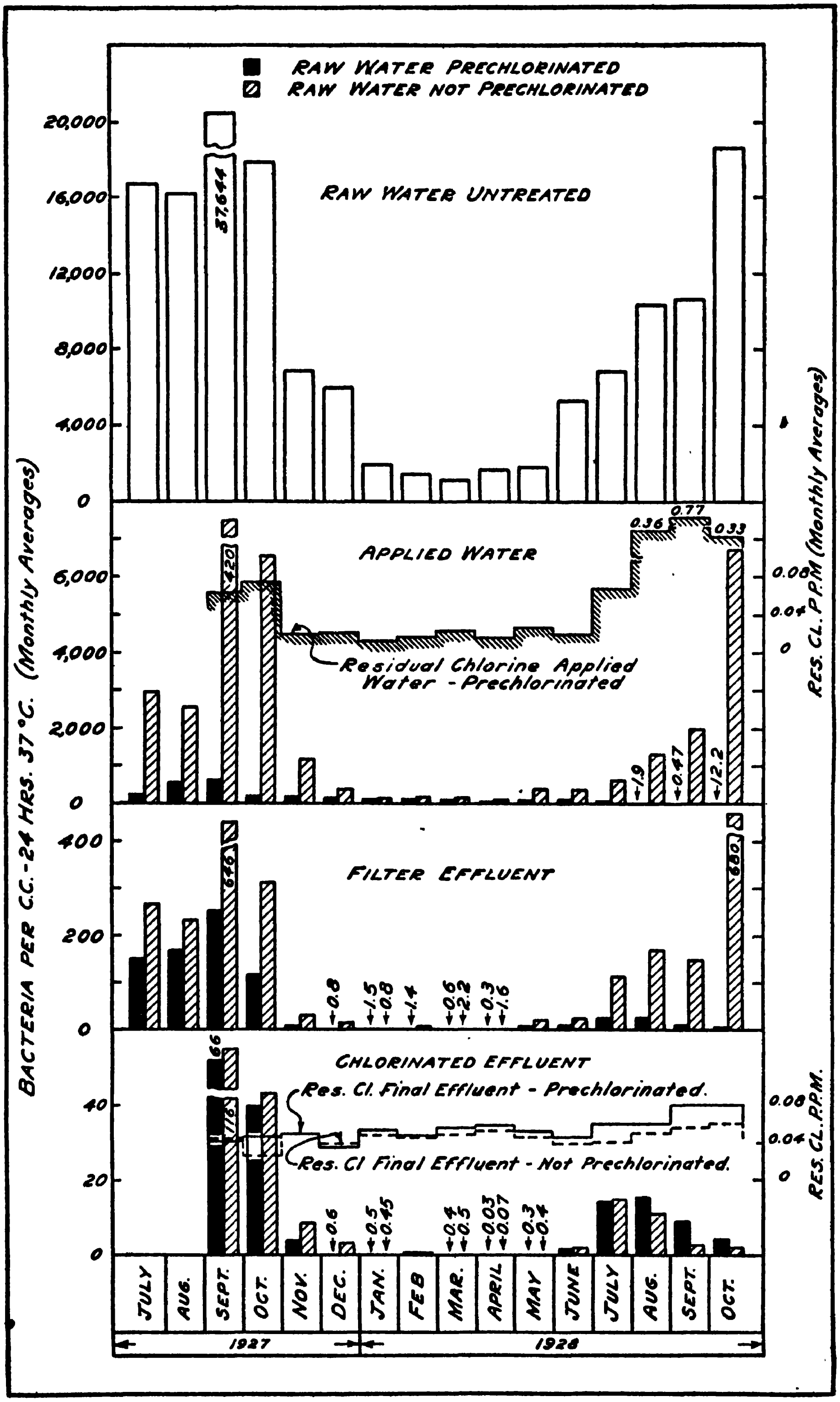

FIGURE 2.—Comparative monthly average bacterial counts, 24 hours at 37° C., observed at successive stages of treatment, with and without prechlorination, during the period of the experiments. (Based on data given in Table No. 1)

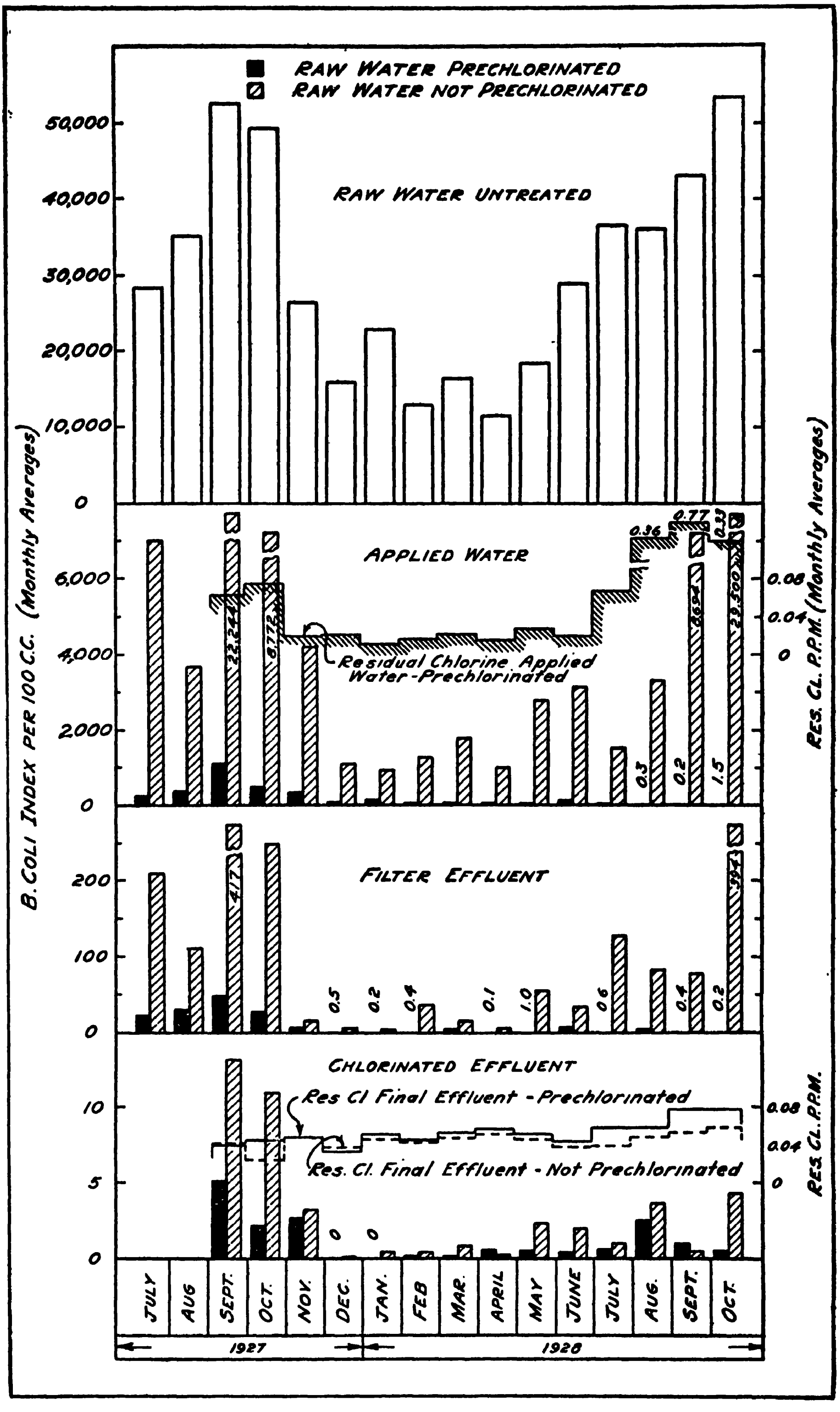

FIGURE 3.—Comparative monthly average *B. coli* indices observed at successive stages of treatment, with and without prechlorination, during the period of the experiments. (Based on data given in Table No. 1)

viously retained in the filter as a consequence of the marked disturbance in the biological flora occurring after heavy prechlorination was instituted.

In order to show the variations in the bacterial efficiency of each separate stage of treatment, from month to month, Table 2 has been prepared in which the percentages of bacteria observed in the effluent of each stage, with and without chlorination, have been referred in each case to the bacterial content of the influent water to that stage. The effect of heavy prechlorination on the bacterial efficiency of coagulation-sedimentation is reflected in the marked decrease observed in the residual percentages of both the 37° C. plate-growing bacteria and the *B. coli* in the applied A water during the three months, August, September, and October, 1928, as compared with the corresponding residuals observed in this effluent during the previous months. It is noteworthy in this connection, however, that during the same three months the efficiency of filtration and of postchlorination was decidedly less in the prechlorinated water than during the months in which the residual chlorine of the applied water was relatively low. It also is to be noted that the bacterial efficiency of filtration was higher during the winter and spring months, both with and without prechlorination, than during the summer and autumn periods.

TABLE 2.—*Percentages of the numbers of bacteria observed in the influent water of each stage of treatment remaining in the effluent of that stage (based on monthly averages given in Table No. 1)*

A=raw water prechlorinated
B=raw water not prechlorinated

Month	Raw water bacterial count 24 hours, 37° C.	Per cent of influent water bacteria remaining in—						Raw water B. coli index per 100 c. c.	Per cent of influent water B. coli remaining in—					
		Applied		Filtered		Postchlorinated			Applied		Filtered		Postchlorinated	
		A	B	A	B	A	B		A	B	A	B	A	B
1927														
July	16,700	1.2	17.7	74.7	9.0	------	------	28,000	0.4	25.1	9.7	3.0	------	-----
August	16,200	3.2	15.9	32.1	9.1	------	------	35,000	1.1	10.6	7.2	3.0	------	-----
September	37,600	1.6	27.7	42.8	6.2	25.2	18.0	52,500	2.1	42.3	4.5	1.9	10.4	3.1
October	17,800	1.1	36.9	56.0	4.8	33.0	13.7	49,400	1.0	17.8	6.2	2.9	5.6	4.0
November	6,960	1.9	17.7	4.5	2.6	64.4	26.9	26,500	1.2	16.0	2.0	.4	41.6	18.3
December	6,060	2.0	6.4	.7	4.6	75.0	17.8	16,100	.07	7.4	4.2	.4	0.0	1.9
1928														
January	1,960	4.0	7.1	1.9	.6	33.3	50.0	23,000	.3	4.0	.3	.3	0.0	18.5
February	1,410	5.5	12.1	1.8	3.5	57.2	13.3	12,400	.1	10.6	2.4	2.9	50.0	1.3
March	1,070	5.7	15.3	1.0	1.3	66.7	22.8	16,600	.4	10.3	3.4	.8	4.6	5.7
April	1,690	3.7	8.7	.5	1.1	10.0	4.4	11,500	.4	9.2	.2	.5	100+	3.9
May	1,730	3.5	23.9	9.5	5.3	.5	1.8	18,700	.3	15.0	1.8	2.0	60.0	4.4
June	5,360	1.8	7.0	10.2	5.9	14.4	9.1	28,800	.5	11.1	2.8	1.1	7.2	5.9
July	6,870	.4	9.2	88.9	18.3	58.3	13.1	36,500	.1	4.4	1.5	8.1	100+	.8
August	10,400	.02	12.6	100+	13.1	62.5	6.4	36,000	.008	9.4	100+	2.5	75.9	4.4
September	10,600	.005	18.9	100+	7.5	86.9	1.6	43,200	.005	21.0	100+	9.2	100+	.6
October	18,700	.06	36.2	29.5	10.0	100+	.3	53,500	.03	55.2	13.3	1.8	100+	1.1

The comparative average efficiencies of bacterial removal effected up to the end of each stage of treatment, both with and without prechlorination, are shown in Table 3 and Figure 4 by average residual

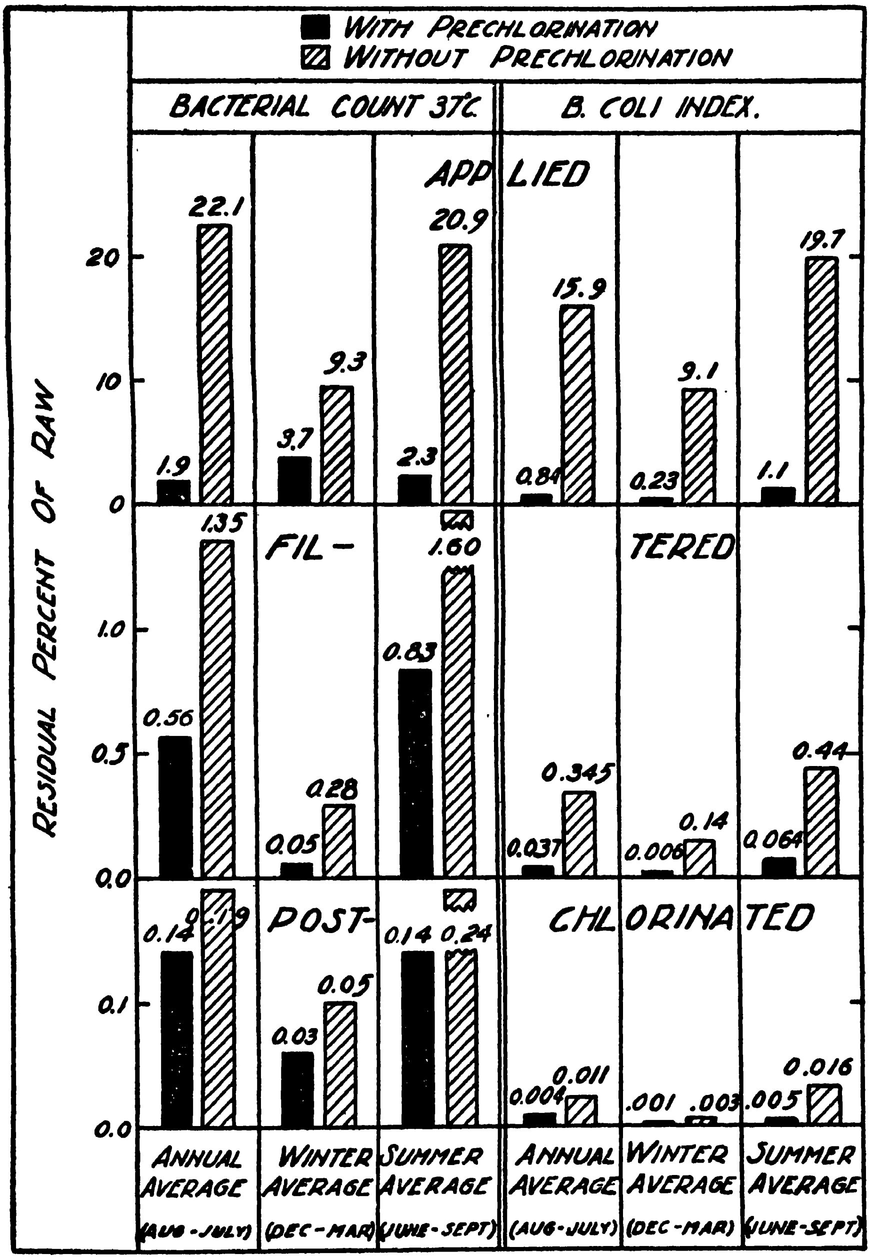

FIGURE 4.—Comparative residual percentages of raw water bacteria observed in effluents of successive stages of treatment, with and without prechlorination, under annual, winter, and summer average conditions. (Based on data given in Table No. 3)

percentages of raw water bacteria observed in the effluent of each stage during three periods—(*a*) from August, 1927, to July, 1928, inclusive, embracing a complete annual cycle; (*b*) from December to

March, the winter period; and (*c*) from June to September, the summer period. In Figure 4 it will be noted that the difference observed between the efficiencies with and without prechlorination was greatest after the first stage of treatment and least after the final stage; also that the efficiency observed during the summer period was slightly less and during the winter period slightly greater, than the annual average.

TABLE 3.—*Comparative averages of bacterial results observed with and without raw water prechlorination, with corresponding residuals, expressed as percentages of raw and of influent water contents, respectively*

(A) = Raw water prechlorinated
(B) = Raw water not prechlorinated

BACTERIAL COUNT, 24 HOURS, 37°C.

		Yearly average (Aug.-July)		Winter (Dec.-Mar.)		Summer (June-Sept.)	
		A	B	A	B	A	B
	Raw	8,730		2,170		14,600	
Per cubic centimeter	Applied	167	1,930	80	202	330	3,050
	Filtered	49	118	1.1	6.1	121	226
	Postchlorinated	12	17	.6	1.1	21	36
Per cent of raw water count.	Applied	1.9	22.1	3.7	9.3	2.3	20.9
	Filtered	.56	1.35	.05	.28	.83	1.6
	Postchlorinated	.14	.19	.03	.05	.14	.24
Per cent of influent water count.	Applied	1.9	22.1	3.7	9.3	2.3	20.9
	Filtered	29.4	6.1	1.4	3.0	36.7	7.4
	Postchlorinated	24.5	14.4	54.5	17.4	25.1	17.2

B. COLI INDEX

		Yearly average (Aug.-July)		Winter (Dec.-Mar.)		Summer (June-Sept.)	
		A	B	A	B	A	B
	Raw	27,200		15,500		34,500	
Per 100 cubic centimeters.	Applied	228	4,410	36	1,420	372	6,800
	Filtered	10	96	.94	21	22	150
	Postchlorinated	1.1	3.1	.10	.48	1.9	5.8
Per cent of raw water index.	Applied	.84	15.9	.23	9.1	1.1	19.7
	Filtered	.037	.345	.006	.14	.064	.44
	Postchlorinated	.004	.011	.0006	.0031	.0052	.0158
Per cent of influent water index.	Applied	.84	15.9	.23	9.1	1.1	19.7
	Filtered	4.4	2.2	2.6	1.5	5.9	2.2
	Postchlorinated	11.0	3.2	10.4	2.3	9.8	4.1

In Figure 5 corresponding plots covering the same periods have been made of the residual percentages of the bacterial numbers in the influent water of each separate stage of treatment observed in the effluent of that stage, thus giving a measure of the comparative efficiency of each stage with and without prechlorination. In this chart it is noted that the average efficiency of bacterial removal by filtration and by postchlorination, respectively, was consistently less in the prechlorinated water than in that which was not prechlorinated, thus indicating that the very marked effect of prechlorination shown at the primary stage of treatment was offset in part by the diminished efficiency of filtration and postchlorination, in comparison with the efficiency observed at these two stages in the absence of

prechlorination. That this result was due, in part at least, to the effect of prechlorination rather than wholly to the reduced density of bacteria in the prechlorinated water, was indicated as will be

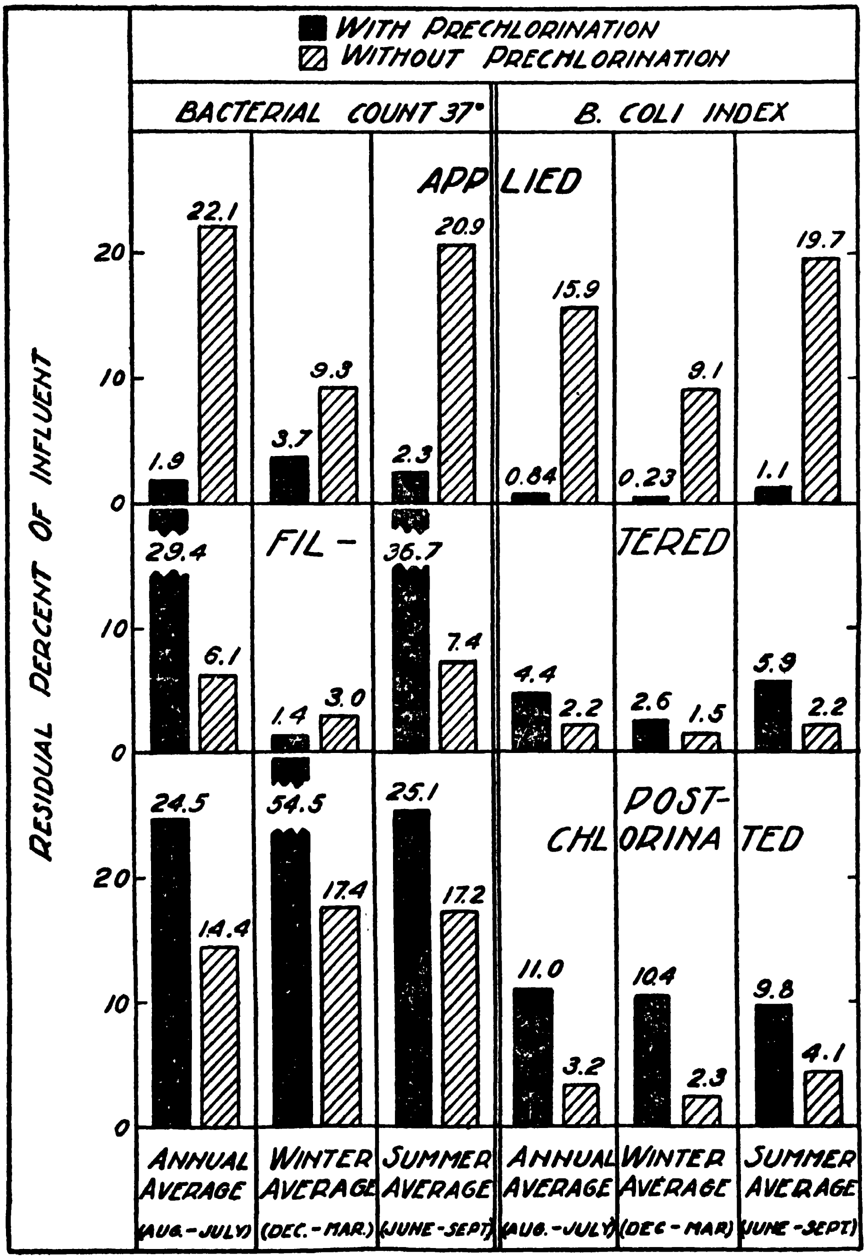

FIGURE 5.—Comparative residual percentages of influent water bacteria observed in effluents of successive stages of treatment, with and without prechlorination, under annual, winter, and summer average conditions. (Based on data given in Table No. 3)

shown at a later point in this text, by the lower efficiency observed at these two stages with approximately the same numbers of bacteria in the influent water.

Effect of prechlorination on relations between quality af raw water and corresponding quality of effluents.—The effect of prechlorination

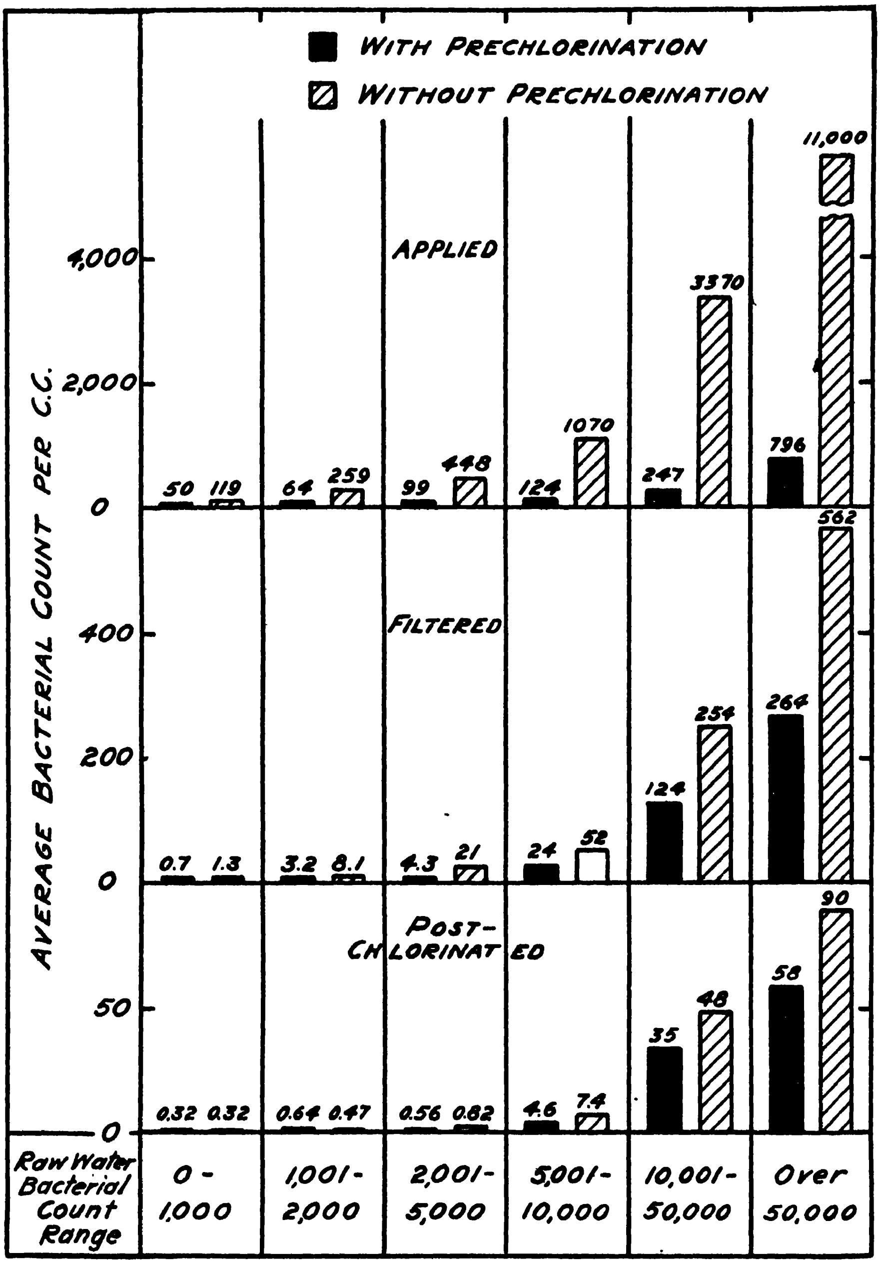

FIGURE 6.—Comparative average numbers of plate-growing bacteria, 24 hours at 37° C., observed in effluents of successive stages of treatment, with and without prechlorination, corresponding to averages of numbers of raw water bacteria falling within various specified ranges. (Based on data given in Table No. 4)

on the relationships observed between the bacterial quality of the raw water and the corresponding quality of the effluents from successive stages of treatment is illustrated in Figures 6 and 7, which have

been plotted from averages as given in Table 4, obtained by grouping the daily results according to the numbers of raw water bacteria

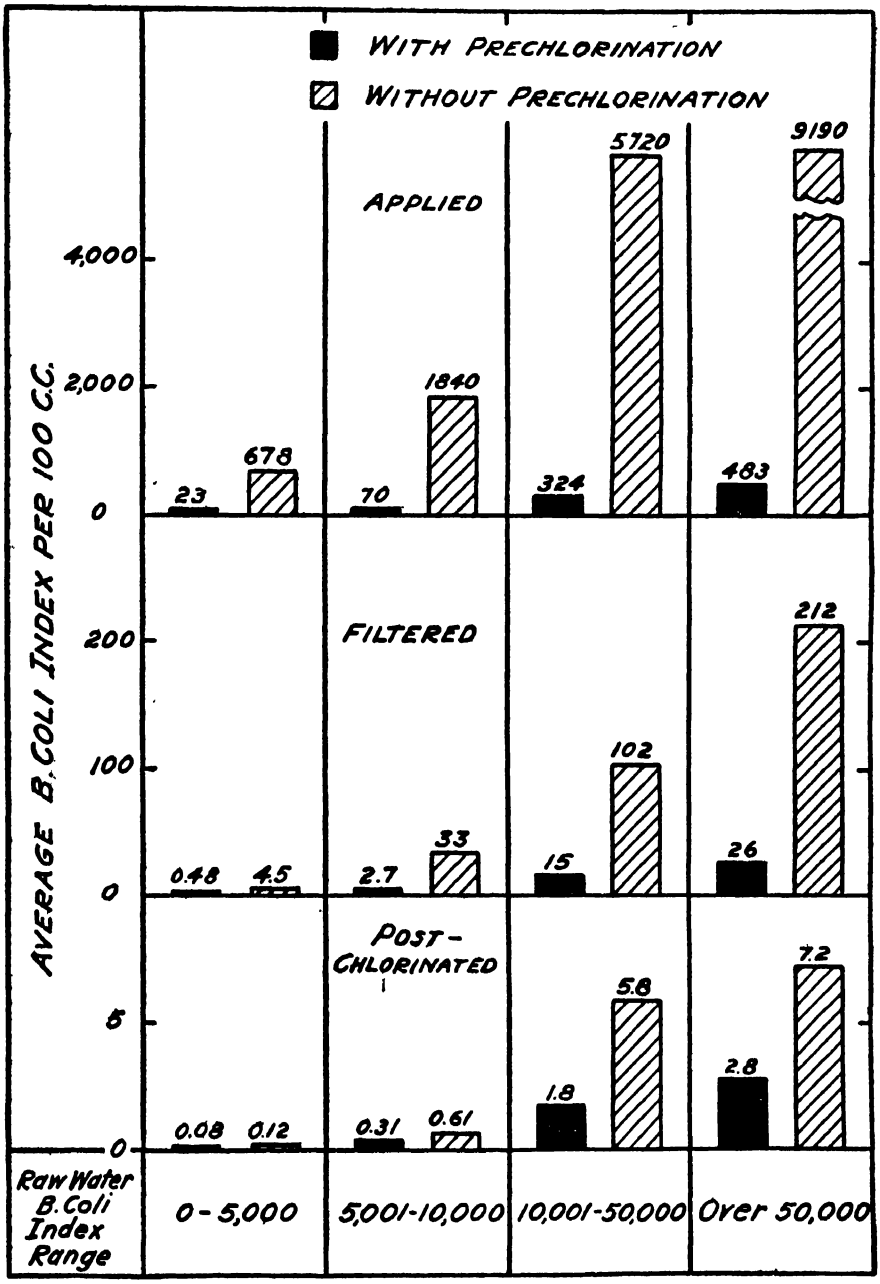

FIGURE 7.—Comparative average numbers of *B. coli* observed in effluents of successive stages of treatment, with and without prechlorination, corresponding to averages of numbers of raw water *B. coli* falling within various specified ranges. (Based on data given in Table No. 4)

falling within various ranges of ascending magnitude and averaging, for each group, the numbers observed simultaneously in the raw water and in the effluent of each stage of treatment.

Table 4.—*Relations between average numbers of bacteria observed in raw water and corresponding average numbers observed in effluents from various stages of treatment, with and without prechlorination*

A = raw water prechlorinated
B = raw water not prechlorinated

BACTERIAL COUNT, 24 HOURS, 37° C. (PER C. C.)

Raw water range	Average numbers							Per cent of raw in—						Per cent of influent in—			
	Raw	Applied		Filtered		Postchlorinated		Applied		Filtered		Postchlorinated		Filtered		Postchlorinated	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
0-1,000	708	50	119	0.7	1.3	0.32	0.32	7.1	16.8	0.10	0.18	0.045	0.045	1.4	1.1	45.7	24.6
1,001-2,000	1,440	64	259	3.2	8.1	.64	.47	4.5	18.0	.22	.56	.044	.033	5.0	3.1	20.0	5.8
2,001-5,000	3,190	99	418	4.3	21	.56	.82	3.1	14.0	.14	.66	.018	.026	4.4	4.7	13.0	3.9
5,001-10,000	7,350	124	1,070	24	52	4.6	7.4	1.7	14.6	.32	.71	.065	.104	19.3	4.9	35.1	17.3
10,001-25,000	14,900	247	3,370	124	254	35	48	1.7	22.6	.83	1.70	.253	.350	50.0	7.5	33.1	17.0
Over 25,000	40,800	796	11,000	264	562	58	90	2.0	27.0	.65	1.38	.134	.207	33.2	5.1	26.8	16.1

B. COLI INDEX (PER 100 C. C.)

Raw water range	Raw	Applied A	Applied B	Filtered A	Filtered B	Postchlorinated A	Postchlorinated B	Applied A	Applied B	Filtered A	Filtered B	Postchlorinated A	Postchlorinated B	Filtered A	Filtered B	Postchlorinated A	Postchlorinated B
0-5,000	2,280	23	678	0.48	4.5	0.08	0.12	1.1	29.1	0.021	0.198	0.0035	0.0053	1.8	0.7	16.7	2.7
5,001-10,000	8,170	70	1,840	2.7	33.4	.31	.61	.86	22.5	.033	.409	.0038	.0075	3.8	1.8	32.0	2.4
10,001-50,000	33,800	324	5,720	15	102	1.8	5.8	.96	16.9	.044	.302	.0053	.0172	4.7	1.8	10.2	6.5
Over 50,000	64,300	483	9,190	26	212	2.8	7.2	.75	14.3	.040	.330	.0044	.0112	5.4	2.3	17.9	3.6

In these charts it will be noted that in both the prechlorinated and nonprechlorinated waters a consistent increase in bacterial content was shown to occur in the effluent of each stage of treatment coincidently with an increase in the numbers of raw water bacteria, though the proportionate extent of increase was measurably less in the prechlorinated water than in that which was not prechlorinated.

When the same group averages were plotted against the corresponding raw water averages on logarithmic scales, a series of plots was obtained such as are shown in Figure 8, which is based on the *B. coli* group averages given in Table 4 and shown in block diagram in Figure 7. In Figure 8 the plots designated as "A" refer to the effluents obtained from the prechlorinated water and those designated as "B" to the corresponding effluents of the nonprechlorination treatment. In each instance, the plotted points followed closely a straight-line trend, which is indicated by a line fitted to the points by the least-squares method. The general character of the relationships thus shown was the same as previously observed, both experimentally and at full-scale municipal plants, between the bacterial quality of raw waters as delivered for treatment and that of the effluents produced from them at various stages of treatment.[8]

From the intersections of these lines with the various ordinates the relative average numbers of *B. coli* observed, with and without prechlorination, in the effluent of each successive stage of treatment, corresponding to given numbers in the raw water, could be readily compared. Such a comparison indicated that with raw water *B. coli* indices falling within the limits, 1,000 to 30,000, prechlorination, as an auxiliary measure, effected a net reduction in *B. coli* numbers ranging from 92 to 96 per cent after coagulation-sedimentation, from 87 to 92 per cent after filtration, and from 40 to 65 per cent after postchlorination. Although the over-all reduction thus shown was less proportionately than at the earlier stages of treatment, it was substantial enough to signify the well-marked increase in over-all efficiency accomplished through the aid of prechlorination.

A question of more practical interest from the viewpoint of this study, on which the plots shown in the chart afforded evidence, was that of the effect of prechlorination on the maximum *B. coli* index of the raw water corresponding to a quality of effluent meeting an accepted standard of limiting *B. coli* content. On referring to the chart it will be noted that in the absence of prechlorination the maximum raw water *B. coli* index corresponding to a quality of postchlorinated effluent meeting the revised Treasury Department standard (i. e., having a *B. coli* index not exceeding 1.0 per 100 c. c.) approximated 10,000, whereas with prechlorination the maximum slightly exceeded 20,000. Similarly, it is indicated that the raw

[8] See Public Health Bulletins Nos. 172 and 193.

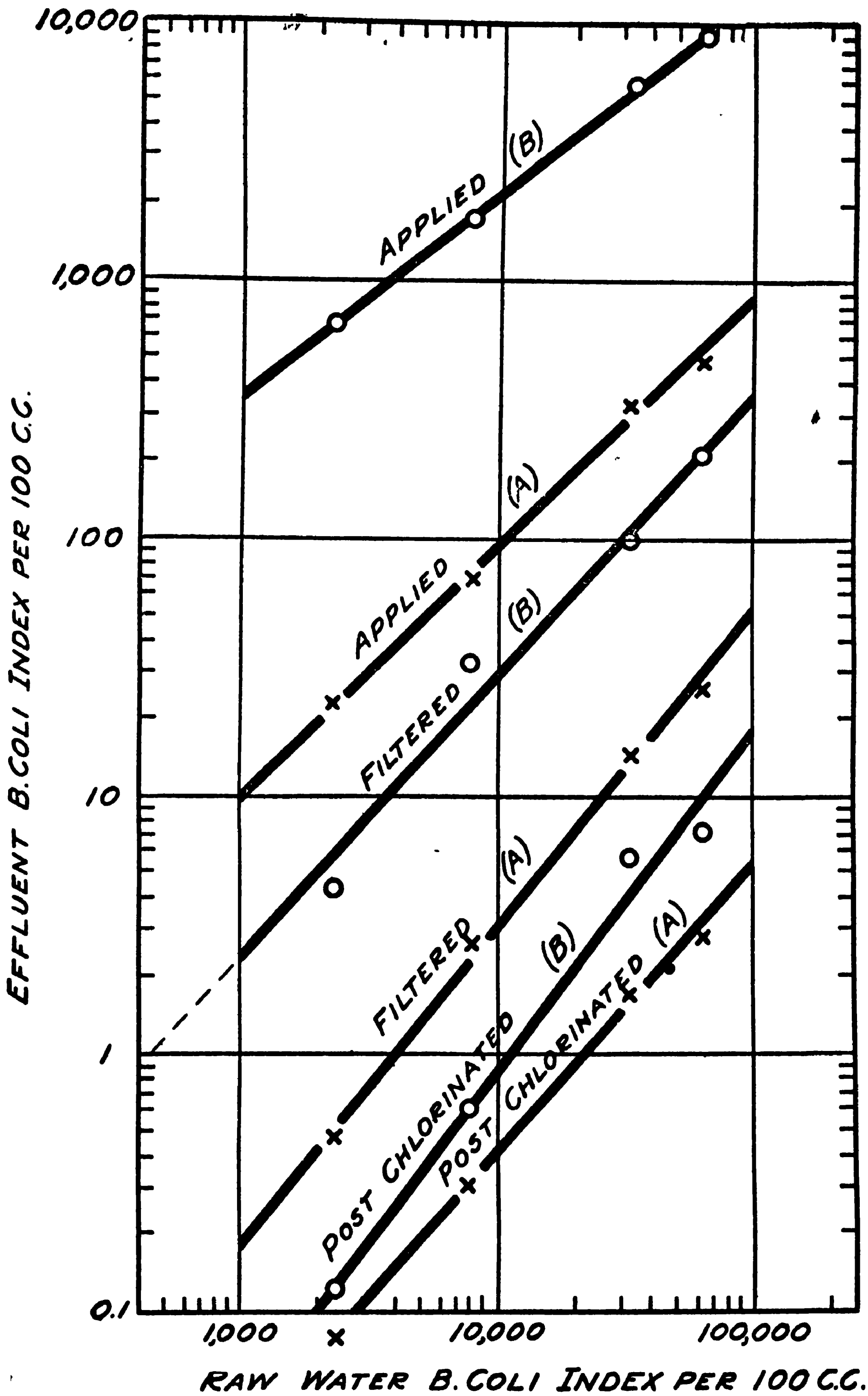

FIGURE 8.—Logarithmic plot showing comparative relations observed between averages of numbers of raw water *B. coli* falling within various ranges and corresponding numbers in effluents of successive stages of treatment, with and without prechlorination. (Based on data given in Table No. 4)

water *B. coli* maximum corresponding to a quality of filtered effluent meeting the same standard approximated 450 without prechlorination and 3,700 with prechlorination.

In so far as these experiments are concerned, they indicate therefore that a postchlorinated effluent of standard quality, as above defined, could be produced from a raw water slightly more than twice as highly polluted, from the standpoint of *B. coli* content, as was possible under the conditions of these experiments without prechlorination. As these conditions were such as to yield somewhat higher average efficiencies of bacterial removal without prechlorination than would be expected from previous observations [9] to occur in the routine performance of the average filter plant of the more simple type, the foregoing statement probably represents a fairly conservative estimate of the proportionate gain in permissible raw water pollution which might be expected to result from prechlorination in normal practice.

From a study of the relationships shown between the average numbers of *B. coli* observed in the influent and effluent waters of filtration and postchlorination, respectively (each being considered as a separate stage of treatment), it was indicated that under similar conditions of bacterial density in the influent water, the efficiency of each one of these two stages was decidedly less in treating prechlorinated water than in treating nonprechlorinated water. These differences are brought out in Figures 9 and 10, the former being a logarithmic plot of the applied versus filtered water group averages given in Table 4 and the latter a similar plot of the filtered versus postchlorinated averages in the same table.

On referring to Figure 9, it thus is shown that with a *B. coli* index of the applied water equivalent to 500, the indicated efficiency of *B. coli* removal by the filter receiving prechlorinated water was 94.6 per cent, whereas that of the filter-treating nonprechlorinated water was 99.2 per cent. In Figure 10, it likewise is shown that with a *B. coli* index of the filtered effluent equal to 50, the indicated efficiency of postchlorination, as applied to the prechlorinated water, was 90 per cent whereas with respect to the nonprechlorinated water it was 96.6 per cent.

From these observations it would appear that some condition resulting from prechlorination, other than lowered bacterial density, brought about a consistent and well-marked decrease in the bacterial efficiency both of filtration and of postchlorination. As regards filtration, it is possible that the constant reception of water containing small amounts of residual chlorine may have disturbed the normal biological condition of the filter sufficiently to cause a slightly di-

[9] See Public Health Bulletins Nos. 172 (p. 173) and 193 (p. 86); also Reprint No. 1114 from the Public Health Reports (p. 24).

minished bacterial efficiency. As regards postchlorination, it is conceivable that the elimination of the less resistant strains of bacteria by prechlorination may have left in the effluent of the filter receiving prechlorinated water a group of bacteria having a higher average degree of resistance to the action of chlorine than was present in the effluent of the filter receiving nonprechlorinated water. Although

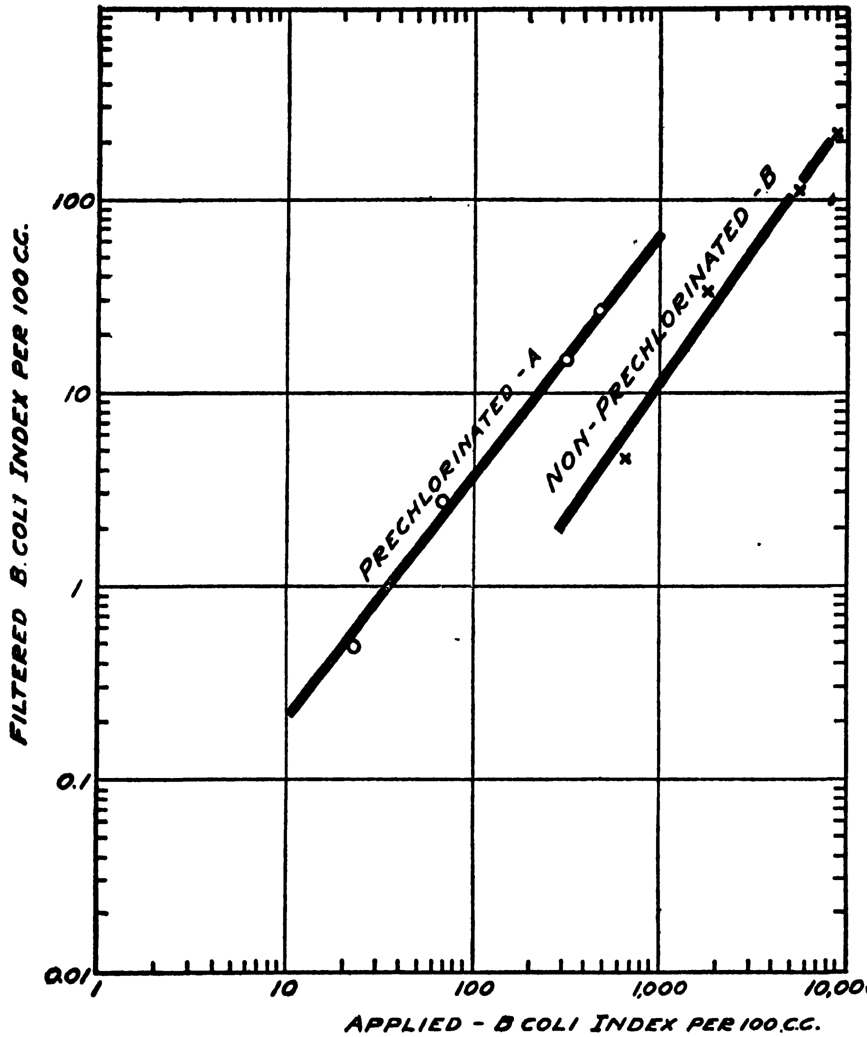

FIGURE 9.—Comparative relations observed between *B. coli* index of water applied to filters receiving prechlorinated and nonprechlorinated waters, respectively, and corresponding *B. coli* index of unchlorinated effluents of these filters. (Based on data given in Table No. 4)

the true reasons for the phenomena observed must remain, for the present at least, unexplained, the significance of these phenomena is fairly evident. In so far as any generalized conclusion may be drawn from these observations, it would seem to be that where raw water prechlorination is practiced regularly and continuously, a certain degree of impairment in the normal bacterial efficiency of filtration

and of postchlorination may be expected to occur. From a practical standpoint such impairment may not be highly important, considering the extent to which it appears to be offset by the effect of prechlorination.

Supplementary observations.—In addition to tests concerned with the effect of prechlorination on the efficiency of bacterial removal,

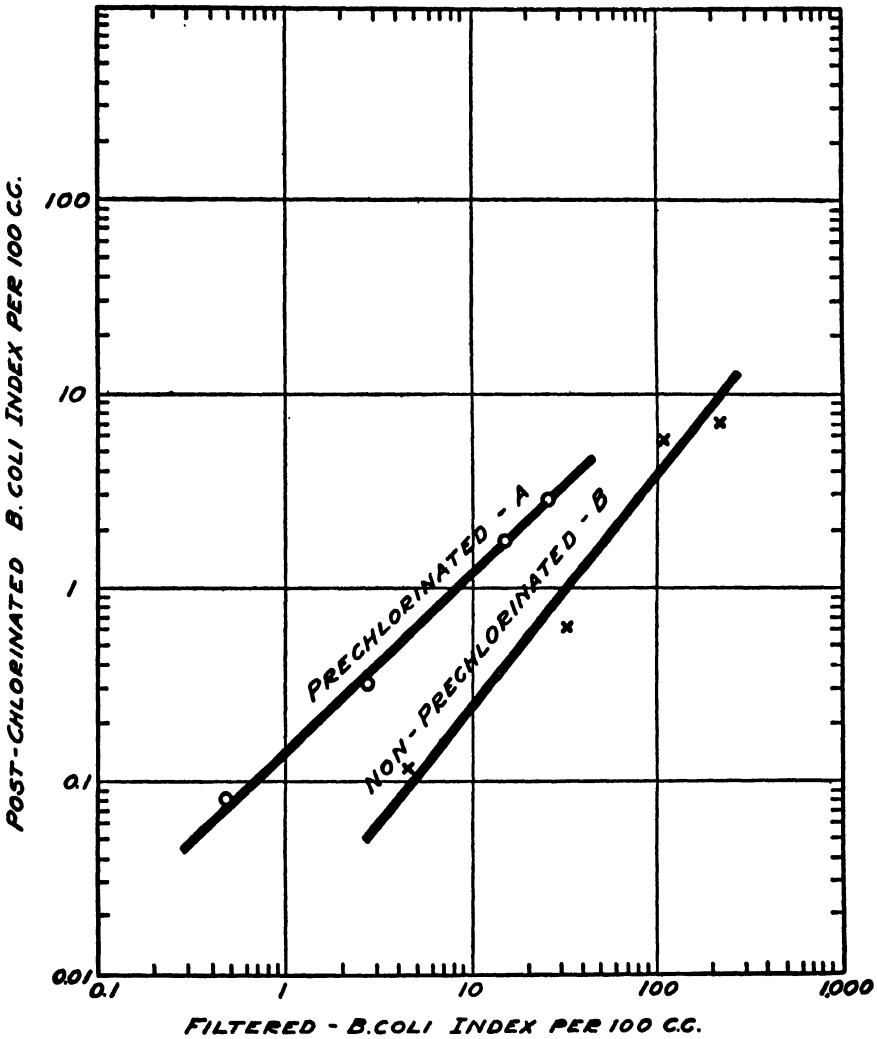

FIGURE 10.—Comparative relations observed between *B. coli* index of unchlorinated effluents of filters receiving prechlorinated and nonprechlorinated waters, respectively, and corresponding *B. coli* index of the same effluents after postchlorination. (Based on data given in Table No. 4)

supplementary observations were made, during the course of the experiments, on certain other aspects of the problem, notably the following:

1. The effect of prechlorination on the development of microscopic organisms in the sedimentation basin and filter.
2. The influence of prechlorination on the length of filter run.

3. The effects of residual chlorine in the applied water on the biological condition of the filter sand.

4. The comparative performances of the plant with relatively low and high chlorine residuals in the prechlorinated water.

Although growths of microscopic organisms developed in the water on only a few brief occasions with sufficient intensity to cause perceptible effects on the operation of the plant, the section of the basin receiving prechlorinated water was noticeably freer from such growths throughout the course of the experiments than was the section receiving unchlorinated water. The difference in this respect was particularly well marked in reference to attached growths, which generally were present in the section of the basin receiving nonprechlorinated water, but practically always absent from the section

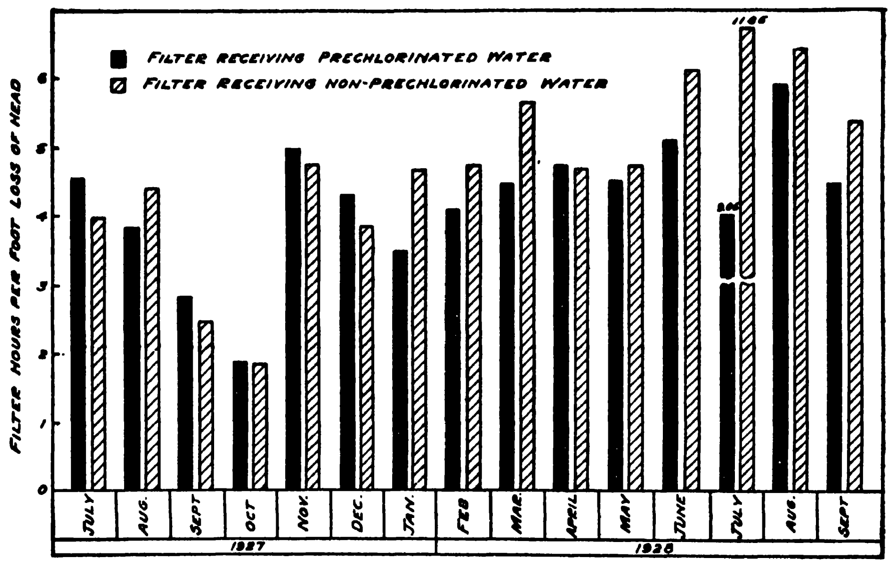

FIGURE 11.—Comparative monthly average periods of service, in filter hours per foot loss of head, of filters receiving prechlorinated and nonprechlorinated water, respectively

receiving prechlorinated water. Prechlorination undoubtedly exerted a beneficial influence in minimizing such growths and their usual consequences.

In spite of these indications, prechlorination failed to display any well-defined tendency toward lengthening filter runs, possibly due, in part at least, to the necessity of adding the coagulant to the raw water before, rather than after, its prechlorination. Whatever the reason, it was observed that the filter receiving prechlorinated water yielded the longer average period of service in only 6 of the 15 months covered by the comparative record. Especially noteworthy in this connection was the failure of this filter to show a longer average run during the last three months of the experiment, when the residual chlorine content of the prechlorinated water was greatly increased. (See fig. 11.)

With a view to ascertaining the extent to which the presence of relatively high residual chlorine in the applied water might affect the biological condition of the filter sand, a series of comparative examinations were made, between June 21 and September 13, 1928, of the bacterial content and 5-day biochemical oxygen demand of samples of sand collected near the surface and at approximately mid-depth of each filter.

At the beginning of the observations, when filter A had been receiving for about a year, prechlorinated water carrying a residual chlorine of 0.02 to 0.05 p. p. m., the bacterial content of the sand in the upper strata of this filter was found to be about 10 per cent of that of the sand in filter B receiving unchlorinated water. As the residual chlorine in the water applied to filter A was increased, this ratio became progressively diminished. At the end of the period, when the residual chlorine of the water applied to filter A had reached about 0.8 p. p. m. the upper strata of this filter contained fewer plate-growing bacteria and were practically free of *B. coli.* The lower strata still yielded considerable numbers of bacteria at this time, though they were somewhat lower than in filter B.

In the foregoing connection it is of interest to note the fairly definite relationship observed between the residual chlorine content of the water applied to filter A and both the bacterial content and oxygen demand of the sand near the surface of this filter. This relationship is illustrated in Figures 12 and 13 by plots of the observations. In Figure 12 the plotted points followed two more or less distinct trends, as indicated by the two dashed-line curves drawn through them. Although the reasons for this divergence were not clear, it appears to have been associated with differences in the action of chlorine in the bacterial flora of the filter during the earlier and later portions, respectively, of the test period. No similar divergence was observed in the oxygen demand plots in Figure 13.

Throughout the period of heavy prechlorination the numbers of bacteria and the biochemical oxygen demand of the sand near the surface of filter A were very considerably less than in the lower strata, indicating that a large proportion of the chlorine absorption by the filter sand occurred in the upper strata. The extent of this absorption may be illustrated by noting that during a period of five weeks, when the residual chlorine content of the applied water averaged 0.76 p. p. m., the corresponding residual in the filtered effluent averaged 0.01 p. p. m., the estimated amount of chlorine absorbed by the filter being, by difference, 0.75 mg. per liter of water filtered, or about 0.4 pound per square foot of filter surface.

Although the major portion of the chlorine thus absorbed appears to have been consumed by the organic matter lodged in the filtering medium, a small part of it seemingly was stored in the filter in its free

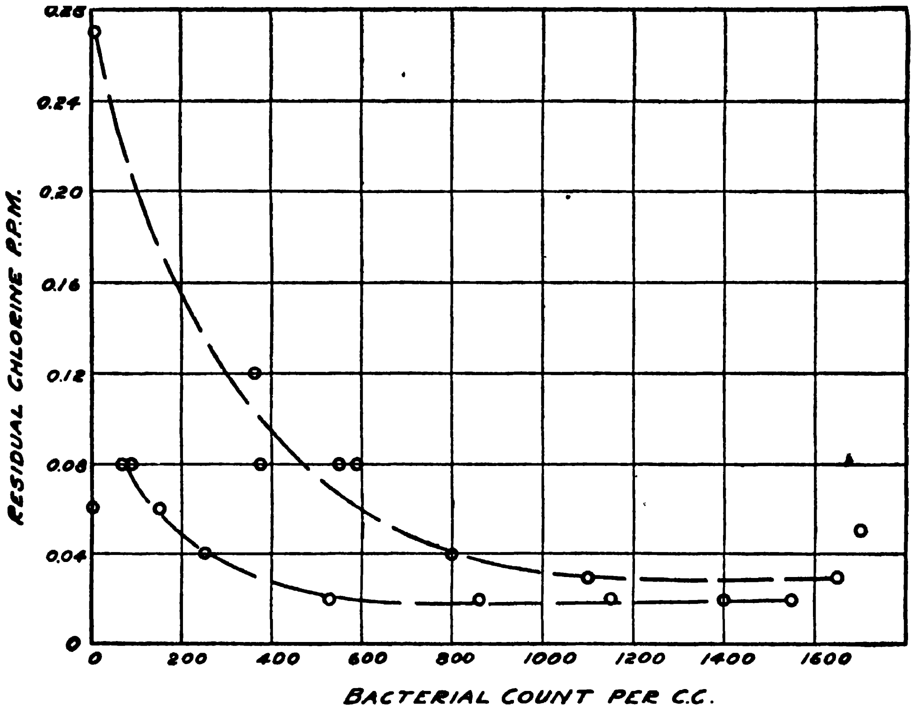

FIGURE 12.—Relation observed between residual chlorine content of water applied to filter A and bacterial content of samples of sand collected from the upper stratum of this filter

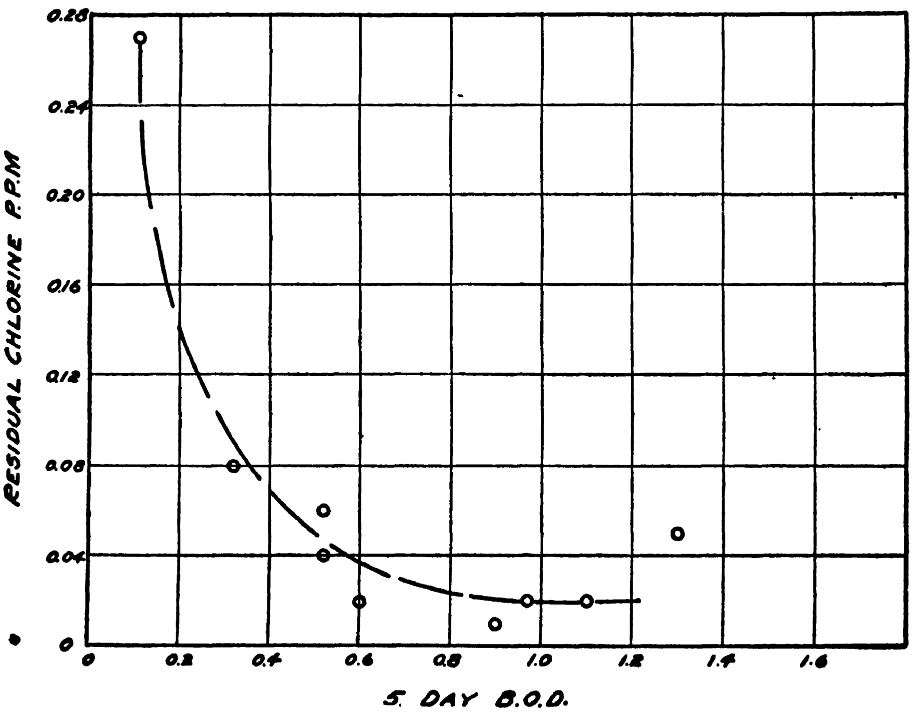

FIGURE 13.—Relation observed between residual chlorine content of water applied to filter A and 5-day biochemical oxygen demand of samples of sand collected from the upper stratum of this filter

state, as was evidenced by the distinct lag, extending over a period of two weeks, observed in the rate of decrease in the residual chlorine of the filtered effluent following a sharp reduction in the chlorine content of the applied water to less than 0.2 p. p. m.

Perhaps the most significant feature of these observations, however, was the persistence of bacterial life in filter A during the 10 weeks of heavy prechlorination, when the residual chlorine content of the applied water averaged 0.6 p. p. m. and ranged as high as 1.2 p. p. m. The only reasonable explanation which can be offered for this phenomenon was that the heavy absorption of chlorine occurring in the upper part of the filter probably reduced the residual chlorine in the water passing through the filter to an extent such that its bactericidal action was lost when it had reached the lower strata.

The data from the entire series of experiments, extending over 16 months, indicated that more consistent and, on the whole, more effective results were obtained from carefully controlled prechlorination of the raw water to a degree such as to maintain a low residual chlorine content of the applied water, averaging about 0.05 p. p. m. and not exceeding 0.1 p. p. m. during short periods. Heavy prechlorination, to the extent carried during the last three months of the period, gave a higher degree of bacterial reduction through the preliminary basin treatment than did simple prechlorination, but exerted a marked disturbing effect on the efficiency of filtration, which was less apparent when a water of low residual chlorine was applied to the same filter.

CONCLUSIONS

The conclusions drawn from the experiments described in this paper may be summarized briefly as follows:

1. Raw water prechlorination, when properly controlled, affords an effective and economical means of reinforcing the bacterial efficiency of rapid sand water filtration processes, these experiments having indicated that the permissible density of *B. coli* in the raw water could be slightly more than doubled by use of this measure.

2. Maintenance of a controlled low residual chlorine in the applied water, averaging 0.05 p. p. m. and not exceeding 0.10 p. p. m., gave more consistent and, in general, more satisfactory results than did superchlorination, with a high residual chlorine.

3. The bacterial efficiencies of filtration and of postchlorination appear, from these observations, to be measurably reduced as the result of prechlorination.

4. Although the length of filter run was not increased by prechlorination under the conditions of these experiments, the development of growths of microscopic organisms was perceptibly retarded by this treatment.

5. The application of prechlorinated water to rapid sand filters appears to lower the bacterial content and the biochemical oxygen demand of the filtering medium. Variations in both of these elements were found to bear a fairly definite relation to concurrent variations in the residual chlorine of the applied water.

More general observations made in the course of the experiments confirmed the prevalent impression that it is advantageous to prechlorinate before, rather than after, preliminary sedimentation in order to utilize the stabilizing effect of basin treatment prior to applying prechlorinated water to filters. They also indicated, however, that even with the stabilizing influence of such basin treatment careful technical supervision and laboratory control are necessary to maintain a relatively constant chlorine content of water applied to filters, which appears to be a desirable condition for consistently effective filtration. Although the ability of well-ripened filters to absorb excessive amounts of chlorine for considerable periods of time constitutes a valuable operating factor of safety, in so far as the production of overchlorinated effluents is concerned, any undue burdening of filters with excessively chlorinated water may be expected, as shown in these studies, to result in a measurable impairment of their bacterial efficiency.

In conclusion, the main advantage of prechlorination, from the viewpoint of this study, may be summed up as being its effectiveness and relative economy as a measure for reinforcing the over-all bacterial efficiency of the rapid-sand filtration process, when considered as a whole. Its principal disadvantage appears to be its tendency to cause a perceptible decrease in the bacterial efficiency of filtration and of postchlorination. From a practical standpoint this advantage appears, from the study herein described, to be outweighed by the advantage above indicated, though it should be taken into account in casting up a balance sheet of performance to be expected in applying this method of treatment.

CONSECUTIVE READINGS OF PULSE RATE ON A SMALL GROUP OF CLERKS

By Rollo H. Britten, *Associate Statistician*, and C. R. Wallace, *formerly Acting Assistant Surgeon, Office of Industrial Hygiene and Sanitation, United States Public Health Service*

Incidental to an uncompleted study of daily variations in blood pressure, consecutive readings of pulse rate were made on a group of 11 men and 11 women doing clerical work between the dates of March 9, 1927, and July 1, 1928. Between 105 and 120 observations were made on each person.[1]

[1] Six individuals who were not included throughout the period of study are omitted from this analysis.

The age of each individual included in this study, together with his height and weight, is given in Table 1. In the last column is presented the amount each person's weight deviates from the average weight for his height and age, compiled by the Association of Life Insurance Medical Directors and the Actuarial Society of America.[2]

TABLE 1.—*Characteristics of individuals included in study*

Subject No.	Age	Height	Weight	Deviation [1]	Subject No.	Age	Height	Weight	Deviation [1]
MALE					FEMALE				
3	22	71	141	−17	23	20	66	119	−14
8	23	65	113	−22	26	25	63	98	−27
6	30	63	170	+36	22	27	64	153	+24
13	34	68	146	−8	27	29	65	100	−32
4	35	66	151	+3	24	38	65	113	−27
11	37	70	141	−26	25	39	63	201	+69
14	47	66	172	+20	20	40	62	109	−24
9	50	68	163	−1	18	45	67	183	+25
2	59	70	187	+15	19	53	67	113	−44
7	60	71	172	−6	17	55	67	166	+9
10	66	65	148	−1	21	62	65	132	−16

[1] Deviations from height-weight-age tests (average weight for specific height and age). See p. 160, Public Health Bulletin No. 162.

The pulse rate was counted as a rule for 15 seconds, but in case of doubt the time was extended. Of course, the figure as set down would be the calculated number of beats per minute. In view of this method of counting the pulse rate, it is evident that the distribution will show a concentration upon certain values, especially those divisible by four; hence, there appears to be no advantage in giving the distributions to the final unit. Instead they have been classed in groups the center of which will invariably be a number divisible by 4, i. e., 50–54, 54–58, 58–62, etc. Items falling exactly at the class limits have been divided, one-half being put in the class below and the other half in the class above. Since so large a proportion of readings were taken for 15 seconds, it is simpler to think of actual readings of 60, 64, 68, 72, etc., instead of the class interval, and the tables have been made up this way.

The pulse rates were obtained during two distinct periods. In the first period, starting March 9, 1927, 50 readings were taken in the morning on each person. These readings were made daily except Saturday and Sunday. In general, this period closed about the end of May, 1927, but on some individuals, in order to obtain the 50 readings, it was necessary to continue the readings somewhat later. The second period ran from December 16, 1927, to May 27, 1928. During this time readings were made three times a week in the morning, those of the men being taken on Monday, Wednesday, and Friday, and those of the women on Tuesday, Thursday, and Saturday.

[2] A Health Study of Ten Thousand Male Industrial Workers, by Rollo H. Britten, associate statistician, and L. R. Thompson, surgeon. Public Health Bulletin No. 162, p. 160.

The readings were made at the beginning of the blood-pressure examinations, but the subject was given a short time to rest before the reading was taken. No effort was made to control the activities of the subject prior to the reading; but, as stated, the group was one doing clerical work, and in most cases no physical exercise had been indulged in immediately before the reading, except that involved in walking to the examination room. No doubt part of the variation in the reading was the result of excitement which individuals might have sometimes been under before the pulse rate was determined.

In regard to the physical condition of the group examined, it can be stated that no serious sickness occurred during the period of the study. The group as a whole seemed to be in about the same physical condition as would be found in any ordinary group of clerical workers. Few of them appeared to be in the habit of taking systematic physical exercise.

The average pulse rate obtained for each person during the entire study is given in Table 2.

TABLE 2.—*Average pulse rate by individuals*

Subject No.	Average pulse rate	Subject No.	Average pulse rate
MEN		WOMEN	
10	91.4	23	86.9
14	82.4	19	79.2
4	78.0	22	76.2
3	77.3	24	76.1
8	75.9	25	70.6
13	75.9	17	70.5
6	75.1	20	69.9
2	74.2	27	69.7
7	71.6	18	69.2
11	68.1	26	69.2
9	65.6	21	68.8
Average	76.0	Average	73.3
		Both sexes, average	74.6

It will be found that the pulse rates of this small group vary from 91.4 to 65.6, with an average of 74.6. Although somewhat lower than would apparently be found in an industrial group of workers,[3] the rates for this clerical group do not seem abnormal. No emphasis is placed upon the average for the group or the differences between men and women, because it is obvious that the number included in the study is too small to be representative. For the same reason no data are included as to the correlation of pulse rate and such factors as age, height, or weight.

The value of these data lies rather in the amount of variation found in any one individual on different days. In Table 3 is given a distribution of pulse-rate readings for each subject and these distributions

[3] An average of 81.1 was found for the pulse rate of a group of ten thousand industrial workers. Public Health Bulletin No. 162. It must be recalled that in this study only one observation was made on a person.

are represented by the graphs in Figure 1, where the ordinate scale represents the number of readings found at any given pulse rate, as indicated along the abscissal scale.

TABLE 3.—*Distribution of pulse rate readings*

Subject No.	52	56	60	64	68	72	76	80	84	88	92	96	100	104	108	112	116
MEN																	
10					2	1	8	11	8	17	15	22	17	7	4	1	
14					2	10	13	38	24	15	9	5	2				
4					2	27	32	35	13	7	2						
3			2	7	9	25	22	26	11	5	2	2	2	1			1
8			1	3	12	36	24	25	6	6	2		1				
13				1	10	32	31	31	9	1							
6				2	11	35	30	27	2	1	1						
2				3	17	40	36	17	3	2							
7			5	14	27	33	21	8	4	1		1					
11		2	10	29	33	32	3	1	3	1							
9	3	3	24	31	31	13	5	2	1								
WOMEN																	
23						6	9	20	13	28	17	21	3	1			
19				1		11	25	58	13	5		1					
22				5	13	29	23	30	7	9		1					
24			1	10	20	19	16	27	9	7	5	2					
25	2	6	6	16	22	23	18	10	6		1	1					
17		2	5	14	30	37	17	4		2	1						
20		1	4	26	31	25	19	8		1							
27		1	12	20	33	28	13	6	5	1							
18		1	4	34	29	27	12	7		2							
26			4	16	48	24	13	1	1								
21		7	6	25	31	19	10	5	2	2	1						

What is most striking in this picture of individual readings from day to day is the wide variation which is found. Part of this may be due to acute illness or unusual conditions of excitement, but it is evident that the normal course of pulse rates from day to day contains an element of great variability. It will be observed that there is considerable contrast among the subjects with respect to such fluctuation. For instance, Nos. 13, 2, 19, and 26 show relatively little fluctuation, while quite the opposite is true of 10, 3, 24, 25, and 21.

To give a more precise measure of the individual variations from day to day the standard deviation [4] and coefficient of variability [5] have been calculated and are given in Table 4.

[4] *Standard deviation.*—The common measure of variability, derived from principles of least squares and mechanics. The mean of a series is obtained and is subtracted from each item. These deviations are squared. The squares are added together and divided by the number of items in the series. The square root of the quotient is obtained. This is the same process as that followed in obtaining the "radius of gyration" in mechanics, and as such is a measure of the absolute amount of variation from the mean.

[5] *Coefficient of variability.*—The standard deviation measures the absolute fluctuation of items around their mean. These values are clearly dependent on the mean. Other things being equal, if the mean of one series is twice the mean of another, the fluctuation will be twice as great. Therefore, for comparative purposes, it is desirable to know how much fluctuation occurs relative to the mean. Obviously, this may be ascertained by dividing the standard deviation by the mean, giving the coefficient of variability. The value is usually expressed as a percentage.

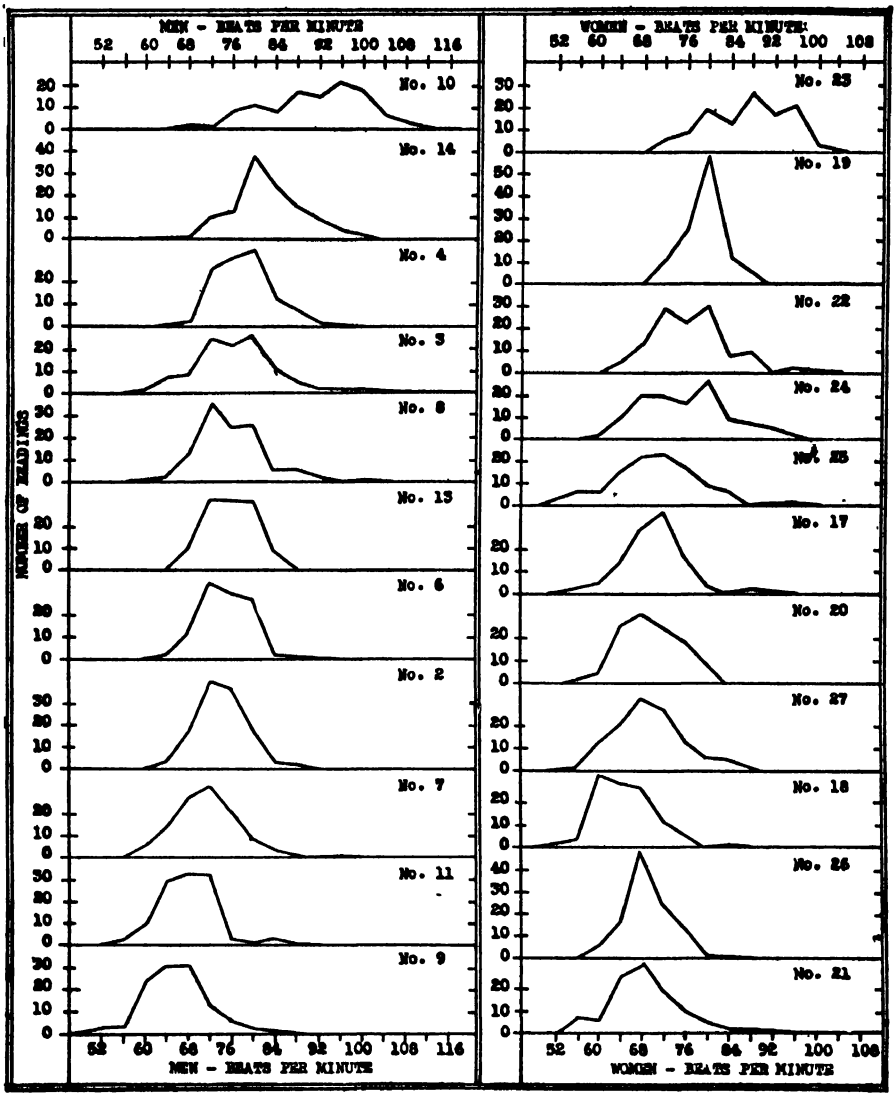

FIGURE 1.—Distribution of pulse rate readings by individuals

TABLE 4.—*Constants of variability for each subject*

Subject No.	Standard deviation	Coefficient of variability	Subject No.	Standard deviation	Coefficient of variability
MEN			WOMEN		
10	9.31	10.2	23	7.41	8.5
14	6.61	8.0	19	4.25	5.4
4	5.06	6.5	22	5.60	7.3
3	9.16	11.9	24	7.97	10.5
8	6.41	8.4	27	6.30	9.0
13	4.67	6.1	17	5.81	8.2
6	4.71	6.3	25	8.01	11.4
2	4.62	6.2	18	5.70	8.2
7	6.13	8.6	20	5.54	7.9
9	5.70	8.7	26	4.29	6.2
11	5.47	8.0	21	7.03	10.2
Average	6.17	8.1	Average	6.17	8.4
			Both sexes, average	6.17	8.3

It is notable that the standard deviation varies among the different subjects, the lowest being 4.3 and the highest 9.3. There is no indication that the variation is significantly greater for one sex than for the other.

The standard deviation is of particular interest because of its relation to the probable error.[6] In view of the fact that the readings are usually divisible by 4, the probable errors are merely suggestive. The probable error of an individual item is roughly two-thirds of the standard deviation.[7] In other words, for individuals included in this study the probable error in the day-to-day reading varies from 2.9 to 6.3, with an average of 4.2. These values define limits within which it is an even chance that any pulse rate reading will fall. For instance, in the case of subject No. 3, the probable error of whose readings is 6.2, it is an even chance, theoretically, that any one reading will lie between 71.1 and 83.5, obtained by adding the probable error to the average of 77.3 and subtracting it from this average.

From these probable errors it is also possible to determine the precision of the means for each individual, since the probable error of the mean is calculated by dividing the probable error of an individual item by the square root of the number of items on which the mean is based. In the case of subject No. 3, on whom 115 observations were made, the probable error of the mean of 77.3 is 0.57. It is evident that the mean pulse rate of each individual in the study has been obtained with a great deal of precision.

The coefficients of variability have been included in the table to indicate the amount of relative dispersion about the mean. Such coefficients are abstract figures and can be compared more or less for different sorts of data. The values for the coefficient usually vary from about 3 for some classes of linear measurements to values as large as 40 or 50 for certain widely fluctuating data.[8] So far as is known, no other material is available for comparison with these coefficients, but it is of interest to contrast these coefficients with those representing variation from person to person.

TABLE 5.—*(A) Average coefficients of variability from day to day and (B) coefficients representing variation from person to person*

	Average of individual coefficients of variability	Coefficients of changes from person to person
Men	8.1	8.7
Women	8.4	7.5
Both sexes	8.3	8.3

[6] The curves given in the figure would appear to approximate a normal distribution closely enough to make the probable error applicable to this case.
[7] 0.6745 times the standard deviation.
[8] Medical Biometry and Statistics, by Raymond Pearl. P. 276.

This table indicates that the variability in pulse rate readings from day to day on a single individual is of the same order of magnitude as the variation in the pulse rate of different individuals. As reflection will show, this is rather surprising, and is a striking manifestation of the great variability in the readings from day to day on a single person.

In view of having successive readings on one person it was of interest to see how the first reading, which would presumably be more affected by uncertainty and excitement than the others, compared with later readings. Table 6 was prepared to bring this point out. It gives the first three readings made on each person (*a*) during the earlier period starting March 9, 1927, and (*b*) during the later period starting December 16, 1927. It will be observed that there is no tendency for the pulse rate to be higher at the earliest readings.

TABLE 6.—*Pulse rate readings on first three days of each period*

Subject No.	Period beginning Mar. 9, 1927			Period beginning Dec. 16, 1927		
	First	Second	Third	First	Second	Third
MEN						
10	100	98	96	96	96	84
14	78	72	72	80	78	72
4	68	72	74	74	72	74
3	78	80	86	70	76	72
8	72	72	78	88	88	80
13	69	68	72	80	80	72
6	72	70	68	92	82	80
2	80	78	76	68	76	72
7	60	62	64	84	66	64
11	64	68	64	58	68	72
9	64	72	68	66	60	64
Average	73.2	73.8	74 4	77.8	76.6	73.3
WOMEN						
23	72	72	72	72	96	80
19	72	74	65	76	80	80
22	80	78	72	78	80	74
24	70	72	68	80	92	76
25	68	58	52	76	60	67
17	68	72	72	72	72	68
20	68	74	72	78	64	60
27	68	66	68	60	68	64
18	70	72	63	68	68	64
21	64	70	72	68	72	68
26	68	60	76	68	64	68
Average	69.8	69.8	68.4	72.4	74.2	69.9
Both sexes	71.5	71.8	71.4	75.1	75.4	71.6

The chronological variations throughout the period of the study for each individual and for the group as a whole were also analyzed. Although individuals show some tendency to have low values for a number of days followed by unusually high values, it has not seemed worth while to bring this out in the tables, because of the limited amount of data. Furthermore, since the readings were usually taken for only 15 seconds, no accurate chronological picture of individual deviations could be presented. In the group as a whole a rise was

manifest from January to June, amounting on the average to about three beats per minute. This increase may well be seasonal in character, but until data are obtained covering 12 consecutive months no assurance can be felt that the relation to season is real. Hence the chronological curve for the whole group has not been presented.

SUMMARY

The interest of this paper for the physician or physiologist lies in its determination of the variation of the pulse rate in the same individual and the extent to which different persons manifest the same or dissimilar tendencies. The group studied consisted of 11 men and 11 women, apparently well, performing work of a clerical nature. Approximately 120 readings of pulse rate were taken on each person in the morning, either on consecutive days or three days a week.

The probable errors of the individual readings were calculated for each individual, the average for all persons being about four beats per minute. Thus, one-half of the readings would be expected to be at least four beats per minute greater or four beats per minute less than the average. Also readings deviating as much as 10 or 15 beats per minute from the true average might occasionally be expected without having any particular significance. Although this statement is true on the average, quite different results were obtained for many individuals, some showing much greater variation, others much less. The individual having the broadest variation showed a probable error of between six and seven beats per minute. The amount of variation from day to day among men seemed about equal to that among women.

Comparison of variation from day to day on single individuals with that from one person to another indicated that the two were of the same order of magnitude.

WHOLE-TIME COUNTY HEALTH OFFICERS, 1930

The following directory has been compiled from data furnished as of January 1, 1930, by State health officers. Similar directories for the years 1922 to 1929, inclusive, have been published in the Public Health Reports. The directory for 1929 was issued as Reprint No. 1341.

In the questionnaire sent for the purpose of obtaining the necessary information, a "whole-time" county health officer was defined as "one who does not engage in the practice of medicine or in any other business, but devotes all his time to official duties."

Directories of State health departments have been published annually by the Public Health Service for the years 1912 to 1930, in-

clusive. The directory for 1929 was issued as Reprint No. 1334 from the PUBLIC HEALTH REPORTS.

Directories of city health officers have been published annually for the years 1916 to 1930, inclusive, the directory for 1929 being Reprint No. 1333.

Directories of State and city health officers for 1930 have been published in Public Health Reports of November 14, 1930 (Reprints Nos. 1425 and 1426 respectively).

State and county	Name of health officer	Post-office address	Official title
Alabama:			
Baldwin	J. A. Norris, jr., M. D	Bay Minette	County health officer.
Barbour	E. M. Moore, M. D	Clayton	Do.
Blount	C. V. Hendrix, M. D	Oneonta	Do.
Bullock	A. M. Shelamer, M. D	Union Springs	Do.
Calhoun	G. A. Cryer, M. D	Anniston	Do.
Chambers	D. D. Carr, M. D	Lafayette	Do.
Cherokee	S. C. Tatum, M. D	Center	Do.
Choctaw	W. G. Carnathan, M. D	Butler	Do.
Clarke	R. D. Neal, M. D	Grove Hill	Do.
Cleburne	F. R. Wood, M. D	Heflin	Do.
Coffee	W. A. Stanley, M. D	Enterprise	Do.
Colbert	W. T. Burkett, M. D	Tuscambia	Do.
Conecuh	E. L. Kelly, M. D	Evergreen	Do.
Covington	T. R. Mellard, M. D	Andalusia	Do.
Crenshaw	J. O. Foster, M. D	Luverne	Do.
Cullman	V. P. Hughes, M. D	Cullman	Do.
Dale	W. L. Orr, M. D	Ozark	Do.
Dallas	L. T. Lee, M. D	Selma	Do.
De Kalb	W. A. Black, M. D	Fort Payne	Do.
Elmore	L. R. Poole, M. D	Wetumpka	Do.
Escambia	G. C. Marlette, M. D	Brewton	Do.
Etowah	W. H. Harper, M. D	Gadsden	Do.
Franklin	L. J. Graves, M. D	Russellville	Do.
Geneva	L. S. Nichols, M. D	Geneva	Do.
Houston	R. E. Neff, M. D	Dothan	Do.
Jackson	M. H. Lynch, M. D	Scottsboro	Do.
Jefferson	J. D. Dowling, M. D	Birmingham	Do.
Lamar	J. A. Jackson, M. D	Vernon	Do.
Lauderdale	W. D. Hubbard, M. D	Florence	Do.
Lawrence	R. E. Harper, M. D	Moulton	Do.
Lee	C. M. Moore, M. D	Opelika	Do.
Limestone	L. R. Murphree, M. D	Athens	Do.
Lowndes	E. F. Leatherwood, M. D	Hayneville	Do.
Macon	E. S. Miller, M. D	Tuskegee	Do.
Madison	W. C. Hatchett, M. D	Huntsville	Do.
Marengo	J. R. Long, M. D	Linden	Do.
Marshall	D. C. Jordan, M. D	Guntersville	Do.
Mobile	C. A. Mohr, M. D	Mobile	Do.
Monroe	T. E. Tucker, M. D	Monroeville	Do.
Montgomery	J. L. Bowman, M. D	Montgomery	Do.
Morgan	H. C. McRee, M. D	Decatur	Do.
Pickens	J. L. Conyers, M. D	Carrollton	Do.
Pike	W. H. Abernethy, M. D	Troy	Do.
Shelby	R. W. Ball, M. D	Columbiana	Do.
Sumter	J. S. Hough, M. D	Livingston	Do.
Talladega	J. H. Hill, M. D	Talladega	Do.
Tallapoosa	C. C. Fargason, M. D	Dadeville	Do.
Tuscaloosa	A. A. Kirk, M. D	Tuscaloosa	Do.
Walker	A. M. Waldrop, M. D	Jasper	Do.
Washington	I. C. Sumner, M. D	Chatom	Do.
Wilcox	E. L. McIntosh, M. D	Camden	Do.
Winston	R. E. Tyler, M. D	Double Springs	Do.
Arizona:			
Cochise	R. B. Durfee	Bisbee	County superintendent of public health.
Coconino	G. F. Manning, M. D	Flagstaff	Do.
Yuma	Harry A. Reese, M. D	Yuma	County health officer.
Arkansas:			
Arkansas			Medical director.
Ashley	M. F. Houston, M. D	Hamburg	Do.
Conway	W. H. Bruce, M. D	Morrilton	Do.
Cross	J. D. McKie, M. D	Wynne	Do.
Desha	J. O. Miller, M. D	McGehee	Do.
Drew	G. C. De Bolt, M. D		Do.
Garland	J. F. Merritt, M. D	Hot Springs	Do.
Jackson	W. P. Moore, M. D	Newport	Do.
Jefferson	Geo. A. Hays, M. D	Pine Bluff	Do.

State and county	Name of health officer	Post-office address	Official title
Arkansas—Continued.			
Little River	J. W. Ringgold, M. D	Ashdown	Medical director.
Mississippi	A. M. Washburn, M. D	Blytheville	Do.
Monroe	A. J. Dunklin, M. D	Clarendon	Do.
Phillips	W. R. Bruce, M. D	Helena	Do.
Pope	A. B. Tate, M. D	Russellville	Do.
Pulaski	C. McA. Wassell, M. D	Little Rock	Do.
Saline	T. C. Watson, M. D	Benton	Do.
Sebastian	J. E. Johnson, M. D	Fort Smith	District health officer.
Union	Ernest W. Prothro, M. D	El Dorado	Medical director.
White	Orlie Parker, M. D	Searcy	Do.
Woodruff	J. F. Hays, M. D	McCrory	Do.
Yell	T. J. Pool, M. D	Ola	Do.
California:			
Contra Costa	I. O. Church, M. D	Martinez	Health officer.
Los Angeles	J. L. Pomeroy, M. D	Los Angeles	Do.
Madera	H. B. Neagle, M. D	Madera	Do.
Monterey	Roy M. Fortier, M. D	Salinas	Do.
Orange	K. H. Sutherland, M. D	Santa Ana	Do.
Riverside	W. B. Wells, M. D	Riverside	Do.
San Diego	Alex. M. Lesem, M. D	San Diego	Do.
San Joaquin	J. J. Sippy, M. D	Stockton	Do.
San Luis Obispo	Allen F. Gillihan, M. D	San Luis Obispo	Do.
Santa Barbara	R. C. Main, M. D	Santa Barbara	Do.
Stanislaus	C. H. Tenent, M. D	Modesto	Do.
Yolo	Fred Fairchild, M. D	Woodland	Do.
Colorado:			
Otero	Guy A. Ashbaugh, M. D	Rocky Ford	Do.
Connecticut:			
Fairfield (town)	Lawrence Poole, M. D	Fairfield	Do.
Florida:			
Manatee	J. W. Hennegan, D. V. M	Bradenton	County health officer.
Sarasota	J. R. Scully, D. V. M	Sarasota	Do.
Georgia:			
Baldwin	J. D. Wiley, M. D	Milledgeville	Commissioner of health.
Bartow	H. C. Pearson, M. D	Cartersville	Do.
Bibb	J. D. Applewhite, M. D	Macon	Do.
Brooks	R. E. McClure, M. D	Quitman	Do.
Chatham	V. H. Bassett, M. D	Savannah	Do.
Clarke	T. H. Johnston, M. D	Athens	Do.
Clinch	J. H. Sessions, M. D	Homerville	Do.
Cobb	J. E. Lester, M. D	Marietta	Do.
Coffee	J. W. Wallace, M. D	Douglas	Do.
Colquitt	T. H. Chesnutt, M. D	Moultrie	Do.
Crisp	Guy G. Lunsford, M. D	Cordele	Do.
Decatur	M. A. Fort, M. D	Bainbridge	Do.
De Kalb	J. R. Evans, M. D	Decatur	Do.
Dougherty	Hugo Robinson, M. D	Albany	Do.
Emanuel	J. R. Dykes, M. D	Swainsboro	Do.
Floyd	B. V. Elmore, M. D	Rome	Do.
Glynn	H. L. Akridge, M. D	Brunswick	Do.
Grady	R. A. Berry, M. D	Cairo	Do.
Hall	C. J. Wellborn, M. D	Gainesville	Do.
Jefferson	W. K. Stewart, M. D	Louisville	Do.
Jenkins	S. H. Haddock, M. D	Millen	Do.
Laurens	O. H. Cheek, M. D	Dublin	Do.
Lowndes	G. T. Crozier, M. D	Valdosta	Do.
Mitchell	C. O. Rainey, M. D	Camilla	Do.
Richmond	E. E. Murphey, M. D	Augusta	Do.
Spalding	W. C. Humphries, M. D	Griffin	Do.
Sumter	W. H. Houston, M. D	Americus	Do.
Thomas	H. B. Jenkins, M. D	Thomasville	Do.
Troup	S. C. Rutland, M. D	Lagrange	Do.
Walker	J. H. Hammond, M. D	La Fayette	Do.
Ware	Geo. E. Atwood, M. D	Waycross	Do.
Washington	O. L. Rogers, M. D	Sandersville	Do.
Wayne	F. C. Story, M. D	Jesup	Do.
Worth	W. C. Tipton, M. D	Sylvester	Do.
Idaho:			
Bonneville	B. L. Arms, M. D	Idaho Falls	County health officer.
Twin Falls	Geo. C. Halley, M. D	Twin Falls	Do.
Illinois:			
Du Page	W. V. Hopf, D. D. S	Wheaton	Superintendent, county health department.
Morgan	W. H. Newcomb, M. D	Jacksonville	Acting county health officer.
Kansas:			
Brown	R. B. Stafford, M. D	Hiawatha	Health officer.
Butler	R. J. Cabeen, M. D	Eldorado	County health officer.
Cherokee	C. R. Hepler, M. D	Columbus	Health officer.
Dickinson	C. H. Munger, M. D	Abilene	Do.
Geary	H. R. Ross, M. D	Junction City	County health officer.
Greenwood	C. L. Miller, M. D	Eureka	Health officer.
Lyon	J. S. Fulton, M. D	Emporia	Do.

State and county	Name of health officer	Post-office address	Official title
Kansas—Continued.			
Marion	J. H. Saylor, M. D	Marion	County health officer.
Ottawa	H. L. Hendricks, M. D	Minneapolis	Health officer.
Sedgwick	M. H. Hostetler, M. D	Wichita	Do.
Shawnee	F. E. McCord, M. D	Topeka	Do.
Kentucky:			
Ballard	G. L. Thompson, M. D	Wickliffe	Director of health.
Bell	M. D. Hoskins, M. D	Pineville	Do.
Boyd	R. D. Higgins, M. D	Ashland	Do.
Breathitt	L. E. Smith, M. D	Jackson	Do.
Bullitt	G. W. Kirk, M. D	Shepherdsville	Do.
Calloway	Jas. A. Outland, M. D	Murray	Do.
Carlisle	H. W. Sterling, M. D	Bardwell	Do.
Carter	G. E. Cecil, M. D	Grayson	Do.
Daviess	S. E. Hainline, M. D	Owensboro	Do.
Elliott	W. H. Wheeler, M. D	West Liberty	Do.
Estill	S. T. Scrivner, M. D	Irvine	Do.
Fayette	R. E. May, M. D	Lexington	Do.
Floyd	Marvin Ransdell, M. D	Prestonsburg	Do.
Fulton	H. E. Prather, M. D	Hickman	Do.
Henderson	E. Cameron, M. D	Henderson	Do.
Hickman	Chas. Hunt, M. D	Clinton	Do.
Hopkins	C. R. Morton, M. D	Madisonville	Do.
Jefferson	E. P. Whistler, M. D	Louisville	Do.
Johnson	C. F. Holtegel, M. D	Paintsville	Do.
Kenton	H. C. White, M. D	Covington	Do.
Knott	J. W. Duke, M. D	Hindman	Do.
Knox	M. W. Steele, M. D	Corbin	Do.
Lawrence	M. H. Skaggs, M. D	Louisa	Do.
Lee	R. H. MacLeod, M. D	Beattyville	Do.
Leslie	H. C. Capps, M. D	Hyden	Do.
Letcher	R. D. Collins, M. D	Whitesburg	Do.
Magoffin	L. C. Coleman, M. D	Salyersville	Do.
Martin	Wm. N. Keith, M. D	Inez	Do.
Mason	J. H. Hutchings, M. D	Maysville	Do.
McLean	J. W. Scudder, M. D	Calhoun	Do.
Menifee	E. T. Riley, M. D	Frenchburg	Do.
Monroe	G. W. Bushong, M. D	Tompkinsville	Do.
Morgan	W. H. Wheeler, M. D	West Liberty	Do.
Muhlenberg	L. D. Whitaker, M. D	Greenville	Do.
Ohio	A. D. Park, M. D	Hartford	Do.
Owsley	Don E. Wilder, M. D	Boonville	Do.
Perry	John O. Salyers, M. D	Hazard	Do.
Pike	F. W. Forge, M. D	Pikeville	Do.
Scott	A. Stewart, M. D	Georgetown	Do.
Trigg	Inman Smith, M. D	Cadiz	Do.
Union	J. F. Lynn, M. D	Morganfield	Do.
Wayne	Norman Westlund, M. D	Monticello	Do.
Webster	Roy Orsburn, M. D	Dixon	Do.
Whitley	M. W. Steele, M. D	Corbin	Do.
Wolfe	John L. Cox, M. D	Campton	Do.
Louisiana:[1]			
Assumption	P. M. Payne, M. D	Napoleonville	Parish health officer.
Avoyelles	R. W. Todd, M. D	Marksville	Do.
Caddo	W. J. Sandidge, M. D	Shreveport	Do.
Caldwell	Thomas Burke, M. D	Columbia	Director of health.
Catahoula	C. T. Richardson, M. D	Harrisonburg	Do.
Claiborne	H. R. Marlatt, M. D	Homer	Do.
Concordia	John Schreiber, M. D	Vidalia	Do.
De Soto	R. A. Tharp, M. D	Mansfield	Parish health officer.
East Carroll		Lake Providence	Director of health.
Franklin	R. E. Applewhite, M. D	Winnsboro	Do.
Iberia	B. L. Stinson, M. D	New Iberia	Parish health officer.
Iberville	J. Cyril Eby, M. D	Plaquemine	Director of health.
Lafayette	R. S. Hernandez, M. D	Lafayette	Do.
Lafourche	H. S. Smith, M. D	Thibodaux	Parish health officer.
La Salle	P. J. Peniston, M. D	Jena	Director of health.
Lincoln	R. H. Allen, M. D	Ruston	Do.
Madison	T. G. Scott, M. D	Tallulah	Do.
Morehouse	N. P. Niles, M. D	Bastrop	Do.
Natchitoches	W. W. Knipmeyer, M. D	Natchitoches	Parish health officer.
Ouachita	John W. Williams, M. D	Monroe	Do.
Pointe Coupee	F. F. Rougon, M. D	New Roads	Do.
Rapides	Edmond Klamke, M. D	Alexandria	Do.
Richland	H. H. Purinton, M. D	Rayville	Director of health.
St. Landry	C. W. Olson, M. D	Opelousas	Do.
St. Martin			
St. Mary	L. R. Craig, M. D	Franklin	Parish health officer.
Tensas	G. D. Williams, M. D	St. Joseph	Director of health.
Terrebonne	Jos. Raphiel, M. D	Houma	Do.
Washington	F. A. Williams, M. D	Franklinton	Do.
Webster	W. C. Sumner, M. D	Minden	Do.
West Carroll	W. L. Stone, M. D	Oak Grove	Do.

[1] Parishes.

State and county	Name of health officer	Post-office address	Official title
Maine:			
Motbov Union [3]	H. L. Jackson, M. D	Old Town	
Rumford [4]	Thomas S. Barr, M. D	Rumford	
Sanford [4]	W. H. Kelly, M. D	Sanford	
Vassalboro [4]	A. R. Daviau, M. D	Vassalboro	
Maryland:			
Alleghany	J. P. Franklin, M. D	Cumberland	County health officer.
Baltimore	J. S. Bowen, M. D	Towson	Do.
Calvert	I. N. King, M. D	Prince Frederick	Do.
Carroll	W. C. Stone, M. D	Westminster	Do.
Cecil	C. A. Kane, M. D	Elkton	Do.
Frederick	E. C. Kefauver, M. D	Frederick	Do.
Harford	C. A. Callahan, M. D	Bel Air	Do.
Montgomery	W. T. Pratt, M. D	Rockville	Do.
Prince Georges	W. S. Keister, M. D	Upper Marlboro	Do.
Talbot	A. L. Oilar, M. D	Easton	Do.
Wicomico	Seth H. Hurdle, M. D	Salisbury	Do.
Massachusetts:			
Barnstable	A. P. Goff, M. D	Hyannis	Do
Michigan:			
Genesee	Charles L. Lambert, M. D	Flint	Health officer.
Oakland	John D. Monroe, M. D	Pontiac	Health commissioner.
Saginaw	Frank L. Rose, M. D	Saginaw	Health officer.
Wexford	Sair C. Moore, M. D	Cadillac	Health commissioner.
Minnesota:.			
St. Louis	G. J. Ferreira, M. D	Duluth	County health officer.
Mississippi:			
Adams	Loren Wallin, M. D	Natchez	Director of health.
Bolivar	R. D. Dedwylder, M. D	Cleveland	Do.
Clarke	D. S. Johnson, M. D	Quitman	Do.
Coahoma	D. V. Galloway, M. D	Clarksdale	Do.
Copiah	J. A. Milne, M. D	Hazlehurst	Do.
Forrest	W. D. Beacham, M. D	Hattiesburg	Do.
Hancock	C. M. Shipp, M. D	Bay St. Louis	Do.
Harrison	Daniel J. Williams, M. D	Gulfport	Health officer.
Hinds	W. E. Noblin, M. D	Jackson	Director of health.
Holmes	T. Paul Haney, jr., M. D	Lexington	Do.
Humphreys	W. W. Scott, M. D	Belzoni	Do.
Issaquena	A. K. Barrier, M. D	Rolling Fork	Do.
Jackson	R. G. Lauder, M. D	Pascagoula	Do.
Lamar	W. H. Cleveland, M. D	Purvis	Do.
Lauderdale	J. T. Googe, M. D	Meridian	Do.
Lee	C. St. C. Guild, M. D	Tupelo	Do.
Leflore	C. P. Googlo, M. D	Greenwood	Do.
Lincoln	W. R. May, M. D	Brookhaven	Do.
Monroe	C. H. Love, M. D	Aberdeen	Do.
Pearl River	G. E. Godman, M. D	Poplarville	Do.
Perry	B. T. Robinson, M. D	New Augusta	Do.
Sharkey	A. K. Barrier, M. D	Rolling Fork	Do.
Sunflower	J. H. Janney, M. D	Indianola	Do.
Tishomingo	J. W. Barkley, M. D	Iuka	Do.
Union	L. A. Barnett, M. D	New Albany	Do.
Warren	F. Michael Smith, M. D	Vicksburg	Do.
Washington	J. W. Shackelford, M. D	Greenville	Do.
Yazoo	Hugh L. McCalip, M. D	Yazoo City	Do.
Missouri:			
Boone	Finis Suggett, M. D	Columbia	Health officer.
Buchanan	W. S. Hull, M. D	St. Joseph	Do.
Dunklin	Wheeler Davis, M. D	Kennett	Do.
Greene	J. W. Williams, M. D	Springfield	Do.
Jackson	Joseph T. Brennan, M. D	Independence	Do.
Marion	E. M. Lucke, M. D	Hannibal	Do.
Mississippi	E. Chas. Rowling, M. D	Charleston	Do.
New Madrid	Wm. N. O'Bannon, M. D	New Madrid	Do.
Nodaway	C. P. Fryer, M. D., D. P. H.	Maryville	Do.
Pemiscot	Fred Ogilvie, M. D	Caruthersville	Do.
St. Francois	W. W. Johnston, M. D	Flat River	Do.
St. Louis	Louis Obrock, M. D	Clayton	Do.
Scott	U. P. Haw, M. D	Benton	Do.
Montana:			
Cascade	Thomas F. Walker, M. D	Great Falls	Do.
Gallatin	A. D. Brewer, M. D	Bozeman	Do.
Lewis and Clark	A. Jordan, M. D	Helena	Do.
Missoula	F. D. Pease, M. D	Missoula	Do.
New Mexico:			
Bernalillo	J. R. Scott, M. D	Albuquerque	County health officer.
Chaves			Do.
Dona Ana	C. W. Gerber, M. D	Las Cruces	Do.
Eddy	O. E. Puckett, M. D	Carlsbad	Do.
McKinley			Do.
Union	H. M. Batson, M, D	Clayton	Do.
Valencia	P. H. McNellis, M. D	Los Lunas	Do.

[3] District. [4] Town.

State and county	Name of health officer	Post-office address	Official title
New York:			
Cattaraugus	R. M. Atwater, M. D., Dr. P. H.	Olean	Health officer.
Cortland	Daniel R. Reilly, M. D	Cortland	County health officer.
Suffolk	Arthur T. Davis, M. D	Riverhead	Do.
Westchester	Matthias Nicoll, jr., M. D	White Plains	Do.
North Carolina:			
Beaufort	R. E. Windley, M. D	Washington	Health officer.
Bertie	J. E. Smith, M. D	Windsor	Do.
Bladen	R. S. Cromartie, M. D	Elizabethtown	Do.
Buncombe	R. E. Fox, M. D	Asheville	Do.
Cabarrus	D. G. Caldwell, M. D	Concord	Do.
Cherokee	W. C. Morrow, M. D	Murphy	Do.
Columbus	Floyd Johnson, M. D	Whiteville	Do.
Craven	D. E. Ford, M. D	New Bern	Do.
Cumberland	L. L. Williams, M. D	Fayetteville	Do.
Davidson	G. C. Gambrell, M. D	Lexington	Do.
Durham	J. H. Epperson, Ph. D	Durham	Do.
Edgecomb	R. E. Broadway, M. D	Tarboro	Do.
Forsythe	J. R. Hege, M. D	Winston-Salem	Do.
Gaston	R. E. Rhyne, M. D	Gastonia	Do.
Granville	J. A. Morris, M. D	Oxford	Do.
Guilford	R. M Buie, M. D	Greensboro	Do.
Halifax	Z. P. Mitchell, M. D	Weldon	Do.
Henderson	J. H. Woodcock, M. D	Hendersonville	Do.
Johnston	C. C. Murray, M. D	Smithfield	Do.
Lenoir	R. S. McGeachy, M. D	Kinston	Do.
Mecklenburg	W. A. McPhaul, M. D	Charlotte	Do.
Moore	J. Symington, M. D	Carthage	Do.
Nash	G. F. Reeves, M. D	Nashville	Do.
New Hanover	J. H. Hamilton, M. D	Wilmington	Do.
Northampton	M. H. Seawell, M. D	Jackson	Do.
Pitt	Clem Ham, M. D	Greenville	Do.
Randolph	G. H. Sumner, M. D	Asheboro	Do.
Richmond	A. B. McCreary, M. D	Rockingham	Do.
Robeson	E. R. Hardin, M. D	Lumberton	Do.
Rowan	C. W. Armstrong, M. D	Salisbury	Do.
Rutherford	J. C. Twitty, M. D	Rutherfordton	Do.
Sampson	John D. Kerr, M. D	Clinton	Do.
Surry	M. T. Foster, M. D	Mount Airy	Do.
Vance	F. R. Harris, M. D	Henderson	Do.
Wake	A. C. Bulla, M. D	Raleigh	Do.
Wayne	L. W. Corbett, M. D	Goldsboro	Do.
Wilkes	J. W. White, M. D	Wilkesboro	Do.
Wilson	L. J. Smith, M. D	Wilson	Do.
Ohio:			
Allen	J. J. Sutter, M. D	Lima	Health commissioner.
Ashtabula	W. S. Weiss, M. D	Jefferson	Do.
Belmont	F. R. Dey, M. D	St. Clairsville	Do.
Butler	C. J. Baldridge, M. D	Hamilton	Do.
Clinton	W. K. Ruble, M. D	Wilmington	Do.
Columbiana	T.T. Church, M. D	Lisbon	Do.
Coshocton	D. M. Criswell, M. D	Coshocton	Do.
Cuyahoga	Robert Lockhart, M. D	Cleveland	Do.
Crawford	G. T. Wasson, M. D	Bucyrus	Do.
Darke	W. D. Bishop, M. D	Greenville	Do.
Delaware	B. B. Barber, M. D	Delaware	Do.
Erie	F. M. Houghtaling, M. D	Sandusky	Do.
Fayette	J. F. Wilson, M. D	Washington C. H	Do.
Franklin	P. B. Wiltberger, M. D	Columbus	Do.
Geauga	Walter Corey, M. D	Chardon	Do.
Hamilton	C. R. Campbell, M. D	Cincinnati	Do.
Hancock	S. F. Whisler, M. D	Findlay	Do.
Hocking	M. W. Bland, M. D	Logan	Do.
Huron	B. C. Pilkey, M. D	Norwalk	Do.
Jefferson	J. P. Young, M. D	Steubenville	Do.
Lake	Walter Corey, M. D	Painesville	Do.
Lorain	C. D. Barrett, M. D	Oberlin	Do.
Lucas	F. F. De Vore, M. D	Toledo	Do.
Mahoning	J. F. Elder, M. D	Youngstown	Do.
Marion	N. Sifritt, M. D	Marion	Do.
Meigs	Mrs. J. N. Gilliford, M. D	Pomeroy	Do.
Mercer	F. E. Ayers, M. D	Celina	Do.
Miami	E. R. Hiatt, M. D	Troy	Do.
Montgomery	H. H. Pansing, M. D	Dayton	Do.
Morrow	R. L. Pierce, M. D	Mt. Gilead	Do.
Perry	F. J. Crosbie, M. D	New Lexington	Do.
Pickaway	A. L. Stump, M. D	Circleville	Do.
Preble	J. I. Nisbet, M. D	Eaton	Do.
Richland	T. R. Meyer, M. D	Mansfield	Do.
Ross	R. E. Bower, M. D	Chillicothe	Do.
Sandusky	O. H. Thomas, M. D	Fremont	Do.
Scioto	R. W. De Crow, M. D	Portsmouth	Do.
Seneca	J. J. Heaton, M. D	Tiffin	Do.
Shelby	B. S. Stephenson, M. D	Sidney	Do.

State and county	Name of health officer	Post-office address	Official title
Ohio—Continued.			
Stark	C. M. Peters, M. D	Canton	Health commissioner.
Summit	R. H. Markwith, M. D	Akron	Do.
Trumbull	L. A. Connell, M. D	Warren	Do.
Tuscarawas	J. Blickensderfer, M. D	New Philadelphia	Do.
Washington	A. G. Sturgiss, M. D	Marietta	Do.
Wayne	W. G. Rhoten, M. D	Wooster	Do.
Wood	H. J. Powell, M. D	Bowling Green	Do.
Oklahoma:			
Carter	John L. Dorough, M. D	Ardmore	County superintendent of health.
Le Flore	W. F. Lunsford, M. D	Poteau	Do.
McCurtain	R. D. Williams, M. D	Idabel	Do.
Muskogee	G. S. Atkinson, M. D	Muskogee	Do.
Okmulgee	J. O. Wails, M. D	Okmulgee	Do.
Osage	H. L. Wright, M. D	Pawhuska	Do.
Ottawa	F. P. Helm, M. D	Miami	Do.
Seminole	George Hunter, M. D	Wewoka	Do.
Pittsburg	Chas. M. Pearce, M. D	McAlester	Do.
Oregon:			
Clackamas	W. H. Miller, M. D	Oregon City	County health officer.
Coos	P. M. Drake, M. D	Coquille	Do.
Douglas	B. R. Shoemaker, M. D	Roseburg	Do.
Jackson	B. C. Wilson, M. D	Medford	Do.
Klamath	G. S. Newsom, M. D	Klamath Falls	Do.
Marion	Vernon Douglas, M. D	Salem	Do.
Multnomah	H. R. Cliff, M. D	Portland	Do.
South Carolina:			
Aiken	W. G. Bodie, M. D	Aiken	Health officer.
Anderson	E. E. Epting, M. D	Anderson	Do.
Beaufort	H. B. Senn, M. D	Beaufort	Do.
Berkeley	T. B. Harper, M. D	Moncks Corner	Do.
Charleston	Leon Banov, M. D	Charleston	Do.
Cherokee	E. P. White, M. D	Gaffney	Do.
Darlington	A. B. Hooton, M. D	Darlington	Do.
Dillon	G. E. McDaniel, M. D	Dillon	Do.
Dorchester	A. R. Johnston, M. D	St. George	Do.
Fairfield	J. L. Bryson, M. D	Winnsboro	Do.
Florence	J. G. McMaster, M. D	Florence	Do.
Georgetown	S. S. Simons, M. D	Georgetown	Do.
Greenville	Baylis Earle, M. D	Greenville	Do.
Greenwood	J. E. Brodie, M. D	Greenwood	Do.
Horry	H. F. Wilson, M. D	Conway	Do.
Kershaw	A. W. Humphries, M. D	Camden	Do.
Lexington	G. R. Westrope, M. D	Lexington	Do.
Marion	B. M. Montgomery, M. D	Marion	Do.
Newberry	H. G. Callison, M. D	Newberry	Do.
Oconee	L. H. Jennings, M. D	Walhalla	Do.
Orangeburg	G. C. Bolin, M. D	Orangeburg	Do.
Richland	John B. Setzler, M. D	Columbia	Do.
Spartanburg	J. Moss Beeler, M. D	Spartanburg	Do.
South Dakota:			
Pennington	A. N. Crain, M. D	Rapid City	Do.
Tennessee:			
Bledsoe	U. B. Bowden, M. D	Pelham	Director of health.
Blount	K. A. Bryant, M. D	Maryville	Do.
Bradley	H. M. Roberson, M. D	Cleveland	Health officer.
Carter	W. W. King, M. D	Elizabethton	Director of health.
Clay	F. B. Clark, M. D	Gainsboro	Do.
Davidson	J. J. Lentz, M. D	Nashville	Health officer.
Dyer	O. F. Agee, M. D	Dyersburg	Do.
Fentress	E. W. Clark, M. D	Livingston	Director of health.
Gibson	J. A. Crabtree, M. D	Trenton	Health officer.
Giles	A. F. Barr, M. D	Pulaski	Director of health.
Greene	R. S. Cowles, M. D	Greeneville	Health officer.
Grundy	U. B. Bowden, M. D	Pelham	Director of health.
Hamilton	J. C. Eldridge, M. D	Chattanooga	Do.
Hardeman	R. L. Cobb, M. D	Bolivar	Do.
Jackson	F. B. Clark, M. D	Gainesboro	Do.
Knox	A. G. Hufstetler, M. D	Knoxville	Do.
Lake	J. P. Moon, M. D	Tiptonville	Do.
Lauderdale	R. B. Griffin, M. D	Ripley	Do.
Lincoln	D. D. Howser, M. D	Fayetteville	Do.
Meigs	J. B. White, M. D	Dayton	Do.
Monroe	H. M. Kelso, M. D	Madisonville	Do.
Montgomery	F. J. Malone, M. D	Clarksville	Health officer.
Obion	J. W. Frost, M. D	Union City	Do.
Overton	E. W. Clark, M. D	Livingston	Director of health.
Pickett	do	do	Do.
Rhea	J. B. White, M. D	Dayton	Do.
Roane	J. C. Fly, M. D	Kingston	Health officer.
Rutherford	J. B. Black, M. D	Murfreesboro	Do.
Sequatchie	U. B. Bowden, M. D	Pelham	Director of health.
Sevier	C. P. Wilson, M. D	Sevierville	Do.
Shelby	W. B. Harrison, M. D	Memphis	Health officer.

State and county	Name of health officer	Post-office address	Official title
Tennessee—Contd.			
Sullivan	F. L. Moore, M. D	Blountville	Director of health.
Sumner	G. M. Morris, M. D	Gallatin	Do.
Tipton	A. J. Butler, M. D	Covington	Do.
Washington	S. S. Moody, M. D	Jonesboro	Do.
Weakley	M. D. Ingram, M. D	Dresden	Health officer.
Williamson	W. C. Williams, M. D	Franklin	Do.
Wilson	W. D. Cagle, M. D	Lebanon	Director of health.
Texas:			
Cameron	R. J. Gillispie, M. D	San Benito	County health officer.
Hidalgo	J. R. Mahone, M. D	Edinburg	Do.
Jefferson	J. D. Blevins, M. D	Beaumont	Do.
McLennan	W. F. Curran, M. D	Waco	Do.
Nolan	M. H. Janson, M. D	Sweetwater	Do.
Tarrant	T. C. Colley, M. D	Fort Worth	Do.
Utah:			
Davis	Sumner Gleason, M. D	Kaysville	Do.
Utah			Do.
Virginia:			
Accomac	C. J. Bradshaw, M. D	Accomac	Health officer.
Albemarle	G. B. Young, M. D	Charlottesville	Do.
Arlington	P. M. Chichester, M. D	Clarendon	Do.
Augusta	H. M. Wallace, M.D	Staunton	Do.
Brunswick	T. H. Valentine, M.D	Lawrenceville	Do.
Greensville	do	do	Do.
Halifax	Kolbe Curtice	South Boston	Do.
Henrico	A. L. McLean, M.D	Richmond	Do.
Isle of Wight	C. H. Dawson, M. D	Suffolk	Do.
Nansemond	do	do	Do.
Norfolk	J. Leake, M. D	Portsmouth	Do.
Northampton	C. J. Bradshaw, M. D	Accomac	Do.
Princess Anne	J. Leake, M. D	Portsmouth	Do.
Rockbridge	R. P. Cooke, M. D	Lexington	Do.
Southampton	B. B. Bagby, M. D	Courtland	Do.
Wise	W. R. Culbertson, M. D	Norton	Do.
Washington:			
Chelan	Paul L. West, M. D	Wenatchee	Do.
Clarke	Geo. H. T. Sparling, M. D.	Vancouver	Do.
King	C. L. Dixon, M. D	Seattle	Do.
Snohomish	H. M. Berge, M. D	Everett	Do.
Spokane	W. M. Newman, M. D	Spokane	Do.
Walla Walla	J. E. Vanderpool, M. D	Walla Walla	Do.
Whitman	R. J. Skaife, M. D	Colfax	Do.
Yakima	H. Storgaard, M. D	Yakima	Do.
West Virginia:			
Berkeley	W. Ross Cameron, M. D.	Martinsburg	Do.
Boone	A. M. Price, M. D	Madison	Do.
Booke	W. J. MacDonald, M. D	Wellsburg	Do.
Fayette	H. H. Puckett, M. D	Fayetteville	Do.
Gilmer	T. E. Cato, M. D	Glenville	Do.
Hancock	J. E. Fisher, M. D	New Cumberland	Do.
Harrison	V. A. Selby, M. D., D. P. H.	Clarksburg	Do.
Kanawha	John Thames, M. D	Charleston	Do.
Logan	V. A. Deason, M. D	Logan	Do.
Marion	F. F. Sowers, M. D	Fairmont	Do.
Monongalia	R. G. Farrier, M. D	Morgantown	Do.
Ohio	W. H. McLain, M. D	Wheeling	Do.
Preston	L. T. Browning, M. D	Kingwood	Do.
Raleigh	A. E. Murphy, M. D	Beckley	Do.
Wood	Arthur D. Knott, M. D	Parkersburg	Do.

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

November 2–29, 1930

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service is summarized below. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of disease."

[1] From the Office of Statistical Investigations, U. S. Public Health Service. The numbers of States included for the various diseases are as follows: Typhoid fever, 41; poliomyelitis, 35; meningococcus meningitis, 42; smallpox, 42; measles, 38; diphtheria, 42; scarlet fever, 41; influenza, 31.

Poliomyelitis.—The poliomyelitis incidence continues on a relatively high level. During the current 4-week period, 697 cases of poliomyelitis were reported, as compared with 1,641 cases during the preceding period. In an absolute sense the current period shows a marked decline in cases since the last period. This, however, is largely attributable to the seasonal decline which normally occurs at this time. It will be observed from the accompanying table that the current incidence was 4.9 times the incidence of the corresponding period of last year. During the preceding report period this ratio stood at 5.6. In relation to last year, therefore, the current incidence is still on a high level. In the far West, there are signs of a decided improvement in the situation. Elsewhere, the picture varies from region to region, as is seen in the table.

TABLE 1.—*Poliomyelitis, by geographical sections*

	Number of cases reported in 1929, 4 weeks ended—				Number of cases reported in 1930, 4 weeks ended—				Ratio of current incidence to that of corresponding 4 weeks of last year period ended—			
	Sept. 7	Oct. 5	Nov. 2	Nov. 30	Sept. 6	Oct. 4	Nov. 2	Nov. 29	Sept. 6	Oct. 4	Nov. 2	Nov. 29
North Atlantic [1]	155	190	129	51	320	449	382	124	2.1	2.4	3.0	2.4
South Atlantic	32	38	25	27	35	38	37	17	1.1	1.0	1.5	.6
East North Central	53	61	65	22	118	284	262	125	2.2	4.7	4.0	5.7
West North Central	16	30	39	11	358	659	571	207	22.4	22.0	14.6	18.8
South Central [2]	20	10	9	6	97	83	63	49	4.9	8.3	7.0	8.2
Mountain and Pacific	53	29	25	24	254	324	326	175	7.7	11.2	13.0	7.3
All regions	309	358	292	141	1,182	1,837	1,641	697	3.8	5.1	5.6	4.9

[1] Includes New England and Middle Atlantic groups.
[2] Includes East and West South Central groups.

Meningococcus meningitis.—During the current period, 319 cases were reported, i. e., approximately 70 per cent of the number for the corresponding period of last year. During the preceding period of this year 291 cases had been reported, or about 80 per cent of the reports for the corresponding period of 1929. In other words, the situation continues to improve in relation to the preceding year.

Scarlet fever.—The scarlet fever situation in most sections is slightly more favorable than it was last year, except in the north Atlantic group of States, where the number of cases, 4,537, is about one-eighth higher than last year. In the reporting area as a whole, 12,257 cases were reported, as compared with 13,391 during the corresponding period of last year.

Typhoid fever.—The excess of cases, which became pronounced about August of this year, has persisted into November. Reported cases during the current period numbered 1,913, compared with 1,242 during the corresponding period last year. The current incidence is relatively high in all regions except in the Great Lakes group of States, and in the Rocky Mountain and Pacific groups.

Smallpox.—The November period is highly favorable in comparison with recent years. During this period, 1,257 cases were reported,

compared with 3,097 for the period in 1929, and 1,655 in 1928. All regions except the South Atlantic participated in the decline.

Measles.—In most regions there were no marked changes from last year except on the North Atlantic Coast where the cases declined by about one-half. In the reporting area as a whole, cases for the current 4-week period were slightly below the corresponding 4-week period of last year.

Influenza.—The incidence continues comparatively low. During the current period 1,626 cases were reported, compared with 2,122 for the period last year.

Diphtheria.—The reported cases, 6,443, were at the lowest level for the period during the last five years. Last year 8,812 cases were reported during the corresponding period.

Mortality, all causes.—The mortality from all causes in large cities as reported in the Weekly Health Index of the Bureau of the Census, averaged 11.6 per 1,000 population, annual basis, for the current period. This is the lowest rate on record for this season. Last year, the corresponding period showed a rate of 11.8, and the year before 12.5.

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for October, 1930

The accompanying table, taken from the Statistical Bulletin for November, 1930, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for October, 1930, as compared with that for the preceding month and for the corresponding month of last year. It also gives the cumulative rates for the period January–October for the years 1930 and 1929. These rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada.

The Bulletin says:

Unless a severe setback takes place in the last six weeks of 1930, the year is destined to be recorded as the best of all health years to date. Among Metropolitan Industrial policyholders living west of the Rocky Mountains, the improvement in the death rate for the first 10 months amounted to 5.8 per cent, as compared with the like part of 1929, and for those in the rest of the United States to 8.8 per cent. Canada, also, is enjoying unprecedentedly favorable health conditions. Among 1,250,000 Metropolitan Industrial policyholders in that country, the cumulative death rate at the end of October was 6.4 per cent lower than in the like part of last year. For the entire group of industrial policyholders the year-to-date death rate for the 10-month period was 8.7 per 1,000 as compared with 9.5 in 1929, a drop of 8.3 per cent. Reports recently received by the company indicate that health conditions have continued favorable for the first two weeks of November.

Health conditions during the month of October were better than the average for that month and showed marked improvement over October, 1929.

Death rates (annual basis) per 100,000 for principal causes of death, October, 1930

[Industrial department, Metropolitan Life Insurance Co.]

Causes of death	Rate per 100,000 lives exposed [1]				
	October, 1930	September, 1930	October, 1929	Cumulative, January-October	
				1930	1929
Total—all causes	810.3	782.8	852.7	873.3	952 0
Typhoid fever	4.4	4.1	3.6	2.2	2.4
Measles	.3	.6	.4	3.2	3.3
Scarlet fever	1.3	1.1	1.3	2.6	2.6
Whooping cough	2.7	4.6	3.8	4.5	6.1
Diphtheria	5.0	2.7	8.4	5.8	8.3
Influenza	6.7	5.5	9.2	14.7	46.0
Tuberculosis (all forms)	75.0	72.8	81.3	82.1	88.9
Tuberculosis of respiratory system	67.4	63.9	70.2	71.4	78.5
Cancer	82.4	78.9	78.1	77.2	77.5
Diabetes mellitus	16.9	15.8	17.0	18.3	18.7
Cerebral hemorrhage	55.7	54.5	[2] 56.6	59.7	[2] 57.9
Organic diseases of heart	130.4	121.6	130.7	143.7	148.4
Pneumonia (all forms)	46.5	34.5	54.1	75.7	91.3
Other respiratory diseases	9.2	8.8	10.6	11.1	12.3
Diarrhea and enteritis	38.5	40.2	32.3	21.0	21.9
Bright's disease (chronic nephritis)	61.9	59.1	63.1	67.4	70.1
Puerperal state	10.1	10.4	10.6	12.2	13.6
Suicides	10.0	9.5	8.6	9.6	8.7
Homicides	6.9	7.4	7.7	6.6	6.5
Other external causes (excluding suicides and homicides)	59.5	64.5	67.0	62.5	64.8
Traumatism by automobiles	23.4	23.7	26.2	20.2	19.9
All other causes	187.4	186.2	203.0	193.2	202.6

[1] All figures in this table include insured infants under 1 year of age. The rates for 1930 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.
[2] Rate not comparable with that for 1930.

COURT DECISION RELATING TO PUBLIC HEALTH

Birth and death registration law construed.—(Illinois Supreme Court; People ex rel. Arnd *v.* Heckard et al., 173 N. E. 124; decided October 25, 1930.) The relator, in a petition for mandamus, alleged that he had made written demand upon the county clerk of Cook County for certified copies of the death certificates of his two brothers, and that the county clerk had said that he could not comply with the demand because the registrar of vital statistics for the city of Chicago had not deposited any records of births or deaths with the county clerk since 1915. The prayer for the writ of mandamus was for the depositing with the county clerk of a complete set of the records of births, stillbirths, and deaths registered with the local registrar of Chicago since 1915. In its disposition of the case, the supreme court construed those provisions of the registration law (Smith-Hurd Revised Statutes, 1929, ch. 111½, secs. 36–57) which were involved, and the following excerpts from the court's opinion will show the construction placed by the court upon such provisions:

The statute thus makes the local registrar a receiving agent to receive the original birth and death certificates, to file them with the State board of health, and to file a copy with the county clerk, who is to keep the record for the entire county. The act does not require the local registrars or the cities to make and retain in their files any permanent record, although it permits the city to do so, at its option and at its own expense. * * *

From the wording of this act we believe that the first copy of the record of births and deaths made by the local registrar is the one required to be turned over by him to the county clerk, and that, in case the local registrar, or the city for which he is acting, desires another copy or copies for his permanent records, such city must make such copies for itself and at its own expense. * * *

* * * Moreover, section 20, in requiring the local registrar to issue certified copies to all applicants, may be construed as applicable to local registrars only in the event the city has elected, in accordance with the provisions of section 18, to keep a permanent record for that purpose, which is made entirely optional with the city. * * *

Section 20 of the act, considered in the light of section 18 as now amended, has a double but not conflicting purpose. Under it the local registrar is required to issue certified copies on application so long as he has the records in his office—that is, in any event, during a current calendar month. Under section 20 the local registrar is also required to issue such certified copies to any applicant at any time, if, as permitted by section 18, the city shall have made extra copies as its permanent record, which, as previously stated, was left optional with the city. In view of the foregoing, there is no irreconcilable conflict between section 20 and section 18, even if the latter section be construed as requiring the registrar to file with the county clerk the first and only copy he makes of the records.

* * * * * * *

It is apparent from the foregoing that the local registrar is required to furnish monthly to the county clerk a record of the births and deaths of the preceding month, and neither the registrar, nor the city constituting the registration district for which the registrar is acting, is entitled to any compensation therefor, either under the act or otherwise, until the end of the calendar year, at which time, if the local registrar has turned over the original certificates to the State board of health and has turned over copies of the certificates to the county clerk, it becomes the duty of the State board of health to certify to the county clerk the fees due and payable by the county to the registrar or the city. It is then for the first time that the county clerk, or other county officer by whom warrants on the county treasurer are issued, is required to issue to the local registrar his warrant upon the county treasurer for the amount of the fees due the registrar under the act, and thereupon the county treasurer is required to pay the same upon presentation. * * *

As to the right of the relator, the court said:

The failure of defendants to comply with the above-mentioned statutory requirements is not disputed. They have not filed certified copies of the records of births, stillbirths, and deaths in the county clerk's office, as required by law. Nor is there any doubt under the existing circumstances but that the relator and the public generally have a clear legal right for which mandamus is an appropriate remedy.

DEATHS DURING WEEK ENDED NOVEMBER 29, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended November 29, 1930, and corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Nov. 29, 1930	Corresponding week, 1929
Policies in force	75, 166, 430	75, 202, 228
Number of death claims	11, 701	11, 704
Death claims per 1,000 policies in force, annual rate	8. 1	8. 1

Deaths [1] from all causes in certain large cities of the United States during the week ended November 29, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census. The rates are not exactly comparable with similar rates published in the Public Health Reports earlier than the issue of August 22, 1930, which were based upon estimates made before the 1930 census was taken]

City	Week ended Nov. 29, 1930				Corresponding week 1929		Death rate [2] for first 48 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1930	1929
Total (78 cities)	7,112	10.7	642	51	12.1	683	11.9	12.6
Akron	29	5.9	5	46	9.9	8	7.9	9.4
Albany [5]	29	11.8	3	62	17.7	2	14.8	16.3
Atlanta	47	9.1	2	20	14.3	10	15.5	15.9
White	19	-------	1	16	-------	8	-------	-------
Colored	28	(6)	1	29	(6)	2	(6)	(6)
Baltimore [5]	187	12.1	19	66	16.4	18	14.0	14.6
White	138	-------	14	62	-------	14	-------	-------
Colored	49	(6)	5	80	(6)	4	(6)	(6)
Birmingham	64	12.9	2	19	15.1	9	13.7	15.9
White	36	-------	0	0	-------	3	-------	-------
Colored	28	(6)	2	49	(6)	6	(6)	(6)
Boston	204	13.6	31	90	13.6	18	14.1	14.9
Bridgeport	19	6.7	1	17	11.7	6	10.8	12.0
Buffalo	127	11.5	14	62	14.2	14	12.9	14.0
Cambridge	25	11.5	1	20	17.5	2	11.8	12.6
Camden	34	15.1	3	53	9.4	2	13.7	14.3
Canton	14	6.9	1	27	12.5	1	9.8	11.2
Chicago [5]	641	9.9	50	44	10.9	89	10.4	11.3
Cincinnati	119	13.8	8	47	16.1	12	15.6	17.0
Cleveland	160	9.2	9	27	10.8	22	11.0	12.3
Columbus	77	13.8	7	69	12.6	7	15.5	14.7
Dallas	55	10.9	9	-------	11.9	4	11.5	11.5
White	43	-------	7	-------	-------	2	-------	-------
Colored	12	(6)	2	-------	(6)	2	(6)	(6)
Dayton	35	9.1	2	30	8.2	3	10.7	11.5
Denver	77	13.9	10	109	14.4	8	14.9	14.8
Des Moines	20	7.3	4	74	12.9	7	11.6	11.5
Detroit	266	8.8	30	46	9.1	33	9.3	11.1
Duluth	15	7.7	2	54	9.8	1	11.4	11.5
El Paso	22	11.2	3	-------	22.8	10	17.0	19.6
Erie	22	9.9	1	22	9.5	4	11.2	12.0
Fall River [5] [7]	26	11.9	2	46	10.9	2	11.7	13.6
Flint	14	4.6	1	12	11.7	7	9.1	10.7
Fort Worth	28	9.0	4	-------	12.5	2	11.0	12.3
White	24	-------	4	-------	-------	2	-------	-------
Colored	4	(6)	0	-------	(6)	0	(6)	(6)
Grand Rapids	32	9.9	2	30	11.6	5	10.1	10.3
Houston	63	11.2	12	-------	16.0	5	12.2	12.6
White	44	-------	6	-------	-------	3	-------	-------
Colored	19	(6)	6	-------	(6)	2	(6)	(6)
Indianapolis	85	12.1	4	30	13.0	0	14.5	14.8
White	72	-------	4	35	-------	0	-------	-------
Colored	13	(6)	0	0	(6)	0	(6)	(6)
Jersey City	64	10.6	10	87	12.8	7	11.4	12.4
Kansas City, Kans	26	11.1	4	93	10.7	2	11.7	12.8
White	19	-------	4	110	-------	1	-------	-------
Colored	7	(6)	0	0	(6)	1	(6)	(6)
Kansas City, Mo	79	10.4	2	17	15.2	6	13.4	14.0
Knoxville	30	14.7	0	0	13.6	3	13.6	13.9
White	20	-------	0	0	-------	3	-------	-------
Colored	10	(6)	0	0	(6)	0	(6)	(6)
Los Angeles	267	11.2	21	63	11.6	17	11.0	11.3
Louisville	58	9.8	5	43	14.9	5	13.5	15.1
White	47	-------	5	49	-------	4	-------	-------
Colored	11	(6)	0	0	(6)	1	(6)	(6)
Lowell [7]	20	10.4	2	53	9.3	1	13.4	14.0
Lynn	13	6.6	0	0	14.3	1	10.3	11.2
Memphis	80	16.5	10	118	24.7	9	17.0	18.9
White	36	-------	3	54	-------	5	-------	-------
Colored	44	(6)	7	235	(6)	4	(6)	(6)
Milwaukee	93	8.5	16	70	8.0	11	9.7	10.9
Minneapolis	87	9.8	5	33	10.7	5	10.7	10.8

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended November 29, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Nov. 29, 1930				Corresponding week 1929		Death rate for first 48 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1930	1929
Nashville	45	15.9	8	126	16.7	4	17.3	18.6
White	32	-------	7	147	-------	2	-------	-------
Colored	13	(6)	1	62	(6)	2	(6)	(6)
New Bedford [7]	27	12.5	3	77	8.7	6	11.0	12.0
New Haven	32	10.3	2	31	13.5	1	12.7	13.5
New Orleans	119	13.6	23	128	19.5	15	17.4	17.6
White	82	-------	16	135	-------	6	-------	-------
Colored	37	(6)	7	113	(6)	9	(6)	(6)
New York	1,287	9.6	101	42	9.9	105	10.7	11.2
Bronx Borough	171	7.0	12	35	6.9	12	7.8	8.2
Brooklyn Borough	465	9.3	39	41	9.1	41	9.7	10.2
Manhattan Borough	497	14.0	43	55	13.9	38	16.0	16.3
Queens Borough	110	5.7	6	24	7.4	13	7.0	7.6
Richmond Borough	35	11.5	1	19	13.5	1	14.0	15.8
Newark, N. J	83	9.7	9	47	13.2	13	11.9	12.6
Oakland	62	11.3	4	50	13.8	3	11.0	11.3
Oklahoma City	67	18.9	7	126	9.8	3	10.9	10.8
Omaha	52	12.6	3	36	14.2	2	13.6	13.6
Paterson	27	10.2	1	17	15.9	5	12.1	13.3
Philadelphia	398	10.6	32	48	11.2	28	12.5	13.1
Pittsburgh	162	12.6	15	53	14.2	10	13.8	14.8
Portland, Oreg	63	10.9	1	12	11.8	6	12.2	12.7
Providence	61	12.7	7	65	14.2	4	12.9	14.4
Richmond	38	10.8	2	29	14.0	7	14.8	16.2
White	25	-------	1	22	-------	3	-------	-------
Colored	13	(6)	1	43	(6)	4	(6)	(6)
Rochester	58	9.3	3	27	12.6	7	11.7	12.3
St. Louis	179	11.3	14	49	13.7	6	14.0	14.6
St. Paul	51	9.8	3	30	13.4	3	10.1	10.5
Salt Lake City [5]	27	10.0	6	95	13.2	3	12.5	13.0
San Antonio	64	11.0	8	-------	18.9	13	14.4	14.6
San Diego	52	18.1	3	63	15.7	1	14.4	15.0
San Francisco	170	14.1	3	20	12.4	5	13.2	13.0
Schenectady	19	10.3	2	62	8.2	0	11.1	12.1
Seattle	79	11.3	4	40	9.3	5	10.9	11.2
Somerville	15	7.5	2	63	10.1	0	9.6	9.2
Spokane	22	9.9	2	52	13.6	3	12.4	12.7
Springfield, Mass	36	12.5	2	34	11.9	3	12.1	12.6
Syracuse	47	11.8	7	86	16.5	3	11.7	12.9
Tacoma	26	12.7	3	82	13.7	1	12.5	11.8
Toledo	54	9.7	5	46	13.9	9	12.6	13.7
Trenton	25	10.6	3	58	11.1	1	16.5	16.9
Utica	17	8.6	2	56	13.8	1	14.6	15.4
Washington, D. C	152	16.3	11	64	16.3	14	15.2	15.3
White	96	-------	4	35	-------	6	-------	-------
Colored	56	(6)	7	125	(6)	8	(6)	(6)
Waterbury	17	8.7	5	122	7.8	4	9.3	9.4
Wilmington, Del. [7]	36	17.9	4	96	17.3	3	14.6	13.9
Worcester	39	10.3	5	69	13.6	3	12.6	12.6
Yonkers	30	11.5	7	167	8.7	3	8.1	9.3
Youngstown	31	9.5	3	43	15.0	2	10.4	12.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Forth Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended December 6, 1930, and December 7, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 6, 1930, and December 7, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929
New England States:								
Maine	3	4	--------	12	23	10	0	1
New Hampshire	5	--------	--------	--------	19	43	0	1
Vermont	2	2	--------	--------	1	6	0	0
Massachusetts	69	134	5	5	230	106	4	4
Rhode Island	7	10	--------	--------	2	3	1	1
Connecticut	18	25	1	3	89	9	4	1
Middle Atlantic States:								
New York	132	184	[1] 7	[1] 34	167	273	17	17
New Jersey	84	174	14	5	147	72	2	3
Pennsylvania	133	202	--------	--------	465	416	5	10
East North Central States:								
Ohio	51	91	4	8	73	295	2	3
Indiana	59	47	11	--------	161	18	9	1
Illinois	160	257	21	29	129	392	7	8
Michigan	51	146	2	2	55	138	1	15
Wisconsin	12	31	25	21	148	253	2	1
West North Central States:								
Minnesota	18	26	--------	1	12	149	0	1
Iowa	8	13	--------	--------	4	107	1	1
Missouri	43	39	3	7	492	37	1	9
North Dakota	12	10	--------	--------	3	7	0	1
South Dakota	10	6	--------	1	1	16	0	1
Nebraska	17	22	3	7	3	105	2	2
Kansas	27	29	2	--------	10	76	0	3
South Atlantic States:								
Delaware	3	2	--------	--------	1	--------	0	0
Maryland [2]	38	38	13	22	6	9	1	1
District of Columbia	15	12	--------	--------	3	--------	2	1
West Virginia	30	33	43	15	9	28	1	2
North Carlonia	107	152	10	11	20	2	4	3
South Carolina	33	48	629	956	--------	--------	1	0
Georgia	18	22	72	133	36	12	4	0
Florida	15	14	3	1	26	7	0	1

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 6, 1930, and December 7, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929
East South Central States:								
Kentucky		31				87	2	0
Tennessee	29	22	54	61	13	16	5	3
Alabama	70	67	31	94	42	14	6	0
Mississippi	35	47					0	0
West South Central States:								
Arkansas	19	12	15	92	1		0	7
Louisiana	20	56	15	36	4	8	2	1
Oklahoma [3]	61	84	47	116	44	39	0	9
Texas	121	127	52	30	44	2	1	2
Mountain States:								
Montana	1	4			3	73	0	4
Idaho					18	50	0	2
Wyoming		4		1		2	0	0
Colorado	9	15			23	12	2	4
New Mexico	18	6	2	1	26	7	2	1
Arizona	5	16	7	24	49	2	0	12
Utah [2]		2	6	3	2	5	3	0
Pacific States:								
Washington	32	13	18		17	35	3	1
Oregon	9	7	15	11	20	41	0	2
California	57	86	63	69	255	184	8	9

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929
New England States:								
Maine	1	0	19	34	0	0	18	3
New Hampshire	0	0	4	7	0	0	1	0
Vermont	0	0	7	1	1	1	1	0
Massachusetts	5	2	204	235	0	0	5	10
Rhode Island	0	0	18	16	0	0	0	1
Connecticut	1	0	57	66	0	0	8	4
Middle Atlantic States:								
New York	8	4	468	325	6	7	28	15
New Jersey	1	2	119	171	0	0	6	4
Pennsylvania	1	3	379	322	0	5	15	20
East North Central States:								
Ohio	16	7	473	232	46	154	31	9
Indiana	1	0	216	160	47	170	12	2
Illinois	9	0	304	564	43	107	19	14
Michigan	5	2	209	268	29	78	18	6
Wisconsin	4	1	83	139	8	36	5	9
West North Central States:								
Minnesota	7	0	61	100	15	8	1	1
Iowa	2	1	50	93	21	78	3	9
Missouri	2	0	90	102	9	30	5	2
North Dakota	1	0	17	26	5	4	4	1
South Dakota	5	0	7	24	17	27	0	0
Nebraska	5	1	44	39	63	29	2	0
Kansas	5	0	63	85	53	44	14	10
South Atlantic States:								
Delaware	1	0	14	1	0	0	1	0
Maryland [2]	1	0	79	77	0	0	7	9
District of Columbia	0	0	20	11	0	0	0	0
West Virginia	0	0	58	58	18	22	19	12
North Carolina	1	3	109	97	0	7	3	9
South Carolina	0	3	20	44	3	0	11	0
Georgia	1	1	56	25	0	0	8	1
Florida	0	0	12	12	0	1	2	1
East South Central States:								
Kentucky	2	1	71	87	0	0	20	5
Tennessee	0	3	58	45	8	4	11	9
Alabama	0	1	82	37	0	0	5	7
Mississippi	1	0	22	19	10	0	16	5

[2] Week ended Friday.
[3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 6, 1930, and December 7, 1929—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929	Week ended Dec. 6, 1930	Week ended Dec. 7, 1929
West South Central States:								
Arkansas	0	0	16	32	8	3	25	6
Louisiana	0	0	18	22	3	1	15	3
Oklahoma [3]	0	0	44	99	20	66	32	17
Texas	4	0	80	48	45	14	8	2
Mountain States:								
Montana	0	0	41	53	16	26	0	5
Idaho	0	0	6	17	0	18	0	0
Wyoming	0	0	1	4	0	18	0	1
Colorado	0	0	11	23	29	5	1	4
New Mexico	2	0	13	9	0	0	5	8
Arizona	0	0	2	8	0	0	1	8
Utah [2]	0	0	6	7	0	0	1	0
Pacific States:								
Washington	2	0	51	45	32	51	5	6
Oregon	2	1	8	33	30	11	3	2
California	12	2	99	349	36	29	12	4

[2] Week ended Friday. [3] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October, 1930										
California	16	284	131	3	500	5	364	372	72	77
New Hampshire		15					9	25		4
South Carolina	[1] 1	386	1,060	3,859	8	318	3	107	2	151
November, 1930										
Connecticut	6	48	15		296		7	147	0	18
Nebraska	5	57	13		25		47	100	84	4
Wyoming	1	3			1		7	21	0	2

[1] Report of 148 cases of meningococcus meningitis in South Carolina during August, published in Public Health Reports dated Oct. 10, 1930, was in error, later report showing only 3 cases.

October, 1930

	Cases
Actinomycosis:	
California	2
Anthrax:	
California	3
Chicken pox:	
California	749
South Carolina	28
Dengue:	
South Carolina	16
Diarrhea:	
South Carolina	502
Dysentery:	
California (amebic)	2
California (bacillary)	18
South Carolina	1
Food poisoning:	
California	12
German measles:	
California	36
Granuloma, coccidioidal:	
California	2
Hookworm disease:	
California	1
South Carolina	119
Jaundice:	
California	1
Leprosy:	
California	1
Lethargic encephalitis:	
California	5
South Carolina	4
Mumps:	
California	603
South Carolina	39
Ophthalmia neonatorum:	
California	1
South Carolina	13
Paratyphoid fever:	
California	2
South Carolina	6

	Cases
Rabies in animals:	
California	73
South Carolina	10
Tetanus:	
California	7
South Carolina	3
Trachoma:	
California	19
Trichinosis:	
California	5
Tularaemia:	
California	2
Undulant fever:	
California	10
Whooping cough:	
California	448
South Carolina	118

November, 1930

	Cases
Chicken pox:	
Connecticut	304
Nebraska	240
Wyoming	79
Conjunctivitis:	
Connecticut	1
Lethargic encephalitis:	
Connecticut	5
Mumps:	
Connecticut	135
Nebraska	26
Wyoming	11
Paratyphoid fever:	
Connecticut	1
Rabies in animals:	
Connecticut	3
Septic sore throat:	
Connecticut	9
Nebraska	7
Trachoma:	
Connecticut	1
Trichinosis:	
Connecticut	1
Undulant fever:	
Connecticut	2
Whooping cough:	
Connecticut	185
Nebraska	33
Wyoming	33

Cases of certain communicable diseases reported for the month of July, 1930, by State health officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	39	21	63	88	57	0	64	2	117
New Hampshire		2			9	0		0	
Vermont	21	9	30	3	13	0		0	46
Massachusetts	273	134	1,207	178	231	0	535	16	680
Rhode Island	16	10	47	9	24	0	54	2	57
Connecticut	74	34	70	61	43	0	112	7	153
New York	604	329	2,795	507	400	43	1,769	100	1,509
New Jersey	137	226	1,250	99	116	0	475	23	339
Pennsylvania	542	331	2,053	461	529	1	570	99	1,011
Ohio	488	121	464	128	316	152	613	110	664
Indiana	44	34	148	11	122	275	245	32	147
Illinois	319	350	505	350	414	185	1,242	104	825
Michigan	319	207	797	166	331	148	520	31	843
Wisconsin	389	43	677	203	141	55	137	5	855
Minnesota	136	53	239		116	14	167	20	112
Iowa	23	12	78	32	36	182	42	7	61
Missouri	67	70	126	38	103	83	209	89	148
North Dakota	15	6	25	25	22	38	14	6	46
South Dakota	36	13	84	2	15	70	15	5	14
Nebraska	47	25	76	24	39	80	19	19	60
Kansas	30	19	175	83	79	76	82	70	210
Delaware	3	4	23	1	14	0	14	3	22
Maryland	71	48	55	42	56	0	251	75	226
District of Columbia	15	31	107		15	0	83	10	47
Virginia	106	53	451		106	15	135	259	564
West Virginia	25	17	92		63	29	55	96	174
North Carolina	77	95	118		112	29		271	900
South Carolina	103	71	13	69	13	1	118	298	250
Georgia	21	17	97	35	21	4	52	252	
Florida		28	20	5	7	2	6	19	3
Kentucky [1]									
Tennessee	6	18	124	13	51	37	[2] 195	296	71
Alabama	25	24	133	18	39	2	291	133	94
Mississippi	242	43	107	251	15	5	267	297	732

[1] Reports received weekly.

[2] Pulmonary.

Cases of certain communicable diseases reported for the month of July, 1930, by State health officers—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Arkansas	11	9	19	4	10	21	[2] 21	154	96
Louisiana	1	39	11	1	33	24	[2] 108	154	39
Oklahoma [3]	13	18	36		34	116	51	167	45
Texas		51			36			81	
Montana	16	3	16	17	36	9	61	10	206
Idaho	20	1	21	14	1	10	10	2	72
Wyoming	3	2	51	4	14	13		1	9
Colorado	29	27	174	43	22	9	157	16	261
New Mexico	16	15	52	10	14	12	91	30	11
Arizona	6	2	161	11	7	5	93	37	17
Utah [1]									
Nevada	5					1	[2] 5		
Washington	98	26	507	146	66	126	124	16	234
Oregon	65	15	144	56	17	36	53	23	174
California	376	211	1,995	696	209	100	941	123	683

Case Rates per 1,000 Population (Annual Basis) for the Month of July, 1930, Based on Provisional Populations

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	0.57	0.31	0.93	1.29	0.84	0.00	0.94	0.03	1.72
New Hampshire		.05			.23	.00		.00	
Vermont	.69	.29	.98	.10	.43	.00		.00	1.51
Massachusetts	.75	.37	3.33	.49	.64	.00	1.48	.04	1.88
Rhode Island	.27	.17	.80	.15	.41	.00	.92	.03	.97
Connecticut	.54	.25	.51	.45	.31	.00	.82	.05	1.12
New York	.56	.31	2.60	.47	.37	.04	1.64	.09	1.40
New Jersey	.40	.66	3.64	.29	.34	.00	1.38	.07	.99
Pennsylvania	.66	.40	2.50	.56	.64	.00	.69	.12	1.23
Ohio	.86	.21	.82	.23	.56	.27	1.08	.19	1.17
Indiana	.16	.12	.54	.04	.44	1.00	.89	.12	.54
Illinois	.49	.54	.78	.54	.64	.29	1.92	.16	1.27
Michigan	.77	.50	1.93	.40	.80	.36	1.26	.07	2.04
Wisconsin	1.56	.17	2.71	.81	.57	.22	.55	.02	3.43
Minnesota	.62	.24	1.09		.53	.06	.76	.09	.51
Iowa	.11	.06	.37	.15	.17	.87	.20	.03	.29
Missouri	.22	.23	.41	.12	.33	.27	.68	.29	.48
North Dakota	.26	.10	.43	.43	.38	.65	.24	.10	.79
South Dakota	.61	.22	1.43	.03	.26	1.19	.26	.09	.24
Nebraska	.40	.21	.65	.20	.33	.68	.16	.16	.51
Kansas	.19	.12	1.09	.52	.49	.48	.51	.44	1.31
Delaware	.15	.20	1.13	.05	.69	.00	.69	.15	1.08
Maryland	.51	.35	.40	.30	.40	.00	1.81	.54	1.63
District of Columbia	.36	.75	2.58		.36	.00	2.00	.24	1.13
Virginia	.52	.26	2.19		.52	.07	.66	1.26	2.74
West Virginia	.17	.12	.62		.43	.20	.37	.65	1.18
North Carolina	.28	.35	.44		.41	.11		1.00	3.33
South Carolina	.70	.48	.09	.47	.09	.01	.80	2.02	1.70
Georgia	.09	.07	.39	.14	.09	.02	.21	1.02	
Florida		.22	.16	.04	.06	.02	.05	.15	.02
Kentucky [1]									
Tennessee	.03	.08	.56	.06	.23	.17	[2] .88	1.33	.32
Alabama	.11	.11	.59	.08	.17	.01	1.29	.59	.42
Mississippi	1.42	.25	.63	1.47	.09	.03	1.56	1.74	4.22

[1] Reports received weekly. [2] Pulmonary. [3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 1,000 Population (Annual Basis) for the Month of July, 1930, Based on Provisional Populations—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Arkansas	.07	.06	.12	.03	.06	.13	[2].13	.98	.61
Louisiana	.01	.22	.06	.01	.18	.13	[2].61	.86	.22
Oklahoma [3]	.07	.10	.20	-------	.19	.66	.29	.95	.26
Texas	-------	.10	-------	-------	.07	-------	-------	.16	-------
Montana	.35	.07	.35	.37	.79	.20	1.34	.22	6.50
Idaho	.53	.03	.55	.37	.03	.26	.26	.05	1.90
Wyoming	.16	.10	2.66	.21	.73	.68	-------	.05	.47
Colorado	.33	.31	1.97	.49	.25	.10	1.78	.18	2.96
New Mexico	.44	.41	1.43	.27	.38	.33	2.50	.82	.30
Arizona	.16	.05	4.32	.30	.19	.13	2.50	.99	.46
Utah [1]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Nevada	.64	-------	-------	-------	-------	.13	[2].64	-------	-------
Washington	.74	.20	3.81	1.10	.50	.95	.93	.12	1.76
Oregon	.80	.18	1.77	.69	.21	.44	.65	.28	2.14
California	.77	.43	4.10	1.43	.43	.21	1.93	.25	1.40

[1] Reports received weekly.
[2] Pulmonary.
[3] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,165,000. The estimated population of the 91 cities reporting deaths is more than 30,570,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended November 29, 1930, and November 30, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,543	2,278	-----------
98 cities	550	846	1,164
Measles:			
45 States	2,332	2,839	-----------
98 cities	673	449	-----------
Meningococcus meningitis:			
46 States	89	128	-----------
98 cities	37	68	-----------
Poliomyelitis:			
46 States	123	39	-----------
Scarlet fever:			
46 States	3,338	3,891	-----------
98 cities	1,099	1,290	1,107
Smallpox:			
46 States	427	853	-----------
98 cities	51	84	28
Typhoid fever:			
46 States	395	310	-----------
98 cities	64	32	44
Deaths reported			
Influenza and pneumonia:			
91 cities	712	679	-----------
Smallpox:			
91 cities	0	0	-----------

City reports for week ended November 29, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	9	1	0	----------	0	0	0	0
New Hampshire:								
Concord	0	0	0	----------	0	0	0	0
Manchester	0	2	1	----------	1	8	0	3
Vermont:								
Barre	2	0	1	----------	0	0	0	0
Burlington	2	1	0	----------	0	0	1	0
Massachusetts:								
Boston	65	38	16	2	1	32	10	17
Fall River	18	4	5	----------	0	1	4	1
Springfield	8	5	1	----------	0	0	5	5
Worcester	28	6	5	----------	0	0	2	0
Rhode Island:								
Pawtucket	2	2	4	----------	0	1	0	0
Providence	5	10	2	----------	0	1	0	4
Connecticut:								
Bridgeport	2	6	0	1	0	0	0	0
Hartford	1	6	2	----------	0	25	1	2
New Haven	2	2	0	----------	0	7	3	3
MIDDLE ATLANTIC								
New York:								
Buffalo	31	19	8	1	1	6	16	18
New York	170	181	52	15	10	58	16	145
Rochester	6	6	1	----------	0	0	3	7
Syracuse	35	3	0	----------	0	0	1	6
New Jersey:								
Camden	9	7	6	2	2	42	5	4
Newark	34	23	10	4	3	3	2	9
Trenton	3	4	3	----------	0	0	0	1
Pennsylvania:								
Philadelphia	150	71	15	2	3	25	22	42
Pittsburgh	52	25	10	----------	5	14	13	28
Reading	14	3	0	----------	0	5	9	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	5	14	1	----------	3	7	6	16
Cleveland	161	53	7	5	1	4	46	18
Columbus	12	11	5	----------	0	1	0	5
Toledo	63	10	6	1	1	1	3	8
Indiana:								
Fort Wayne	7	5	5	----------	0	3	0	1
Indianapolis	71	13	7	----------	0	2	10	12
South Bend	0	2	1	----------	0	0	0	1
Terre Haute	2	2	0	----------	0	0	0	3
Illinois:								
Chicago	80	145	118	3	3	6	31	40
Springfield	1	3	1	----------	0	0	0	2
Michigan:								
Detroit	86	69	43	2	2	16	16	18
Flint	16	4	1	----------	0	2	0	2
Grand Rapids	7	2	0	----------	1	0	0	0

City reports for week ended November 29, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	40	2	0	---------	0	0	0	0
Madison	61	2	0	---------	---------	2	6	---------
Milwaukee	96	21	6	1	1	3	46	7
Racine	29	4	1	---------	0	1	1	0
Superior	7	1	0	---------	0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	8	0	0	---------	0	1	0	0
Minneapolis	42	30	7	---------	0	1	16	11
St. Paul	22	15	4	---------	0	0	4	4
Iowa:								
Davenport	2	1	0	---------	---------	0	0	---------
Des Moines	1	3	0	---------	---------	0	0	---------
Sioux City	8	2	0	---------	---------	1	5	---------
Waterloo	24	0	0	---------	---------	0	0	---------
Missouri:								
Kansas City	25	10	10	---------	0	1	0	2
St. Joseph	0	2	2	---------	0	0	0	3
St. Louis	41	45	23	1	---------	328	9	---------
North Dakota:								
Fargo	4	0	1	---------	0	0	9	0
Grand Forks	0	0	0	---------	---------	0	0	---------
South Dakota:								
Aberdeen	2	0	0	---------	---------	0	0	---------
Sioux Falls	0	0	0	---------	---------	0	0	---------
Nebraska:								
Omaha	16	11	9	---------	0	1	2	5
Kansas:								
Topeka	7	2	0	---------	0	0	0	3
Wichita	3	3	1	---------	0	2	0	3
SOUTH ATLANTIC								
Delaware:								
Wilmington	2	3	2	---------	0	1	0	7
Maryland:								
Baltimore	56	30	10	5	0	1	3	30
Cumberland	0	1	0	---------	0	0	0	0
Frederick	8	0	0	---------	0	0	0	0
District of Columbia:								
Washington	17	20	3	---------	0	1	0	15
Virginia:								
Lynchburg	5	4	3	---------	0	0	1	6
Norfolk	1	4	0	---------	0	1	0	1
Richmond	3	15	3	---------	0	13	2	7
Roanoke	12	4	4	---------	0	0	0	0
West Virginia:								
Charleston	10	2	1	---------	0	0	0	1
Wheeling	18	2	0	---------	0	1	0	3
North Carolina:								
Raleigh	6	2	2	---------	0	0	0	0
Wilmington	0	1	2	---------	0	0	0	2
Winston-Salem	9	3	0	---------	0	0	0	4
South Carolina:								
Charleston	0	2	0	10	0	0	0	2
Columbia	3	1	0	---------	0	0	2	3
Greenville	2	0	1	---------	0	0	0	0
Georgia:								
Atlanta	3	7	1	22	2	4	0	5
Brunswick	1	0	0	---------	1	0	0	2
Savannah	0	3	2	5	1	1	0	3
Florida:								
Miami	0	3	1	---------	0	0	0	0
St. Petersburg	---------	0	---------	---------	0	---------	---------	0
Tampa	0	3	0	2	1	0	0	0

City reports for week ended November 29, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	2	1	----------	0	1	1	1
Tennessee:								
Memphis	25	8	7	----------	1	2	3	3
Nashville	2	3	2	----------	0	0	0	7
Alabama:								
Birmingham	2	7	6	----------	3	8	0	5
Mobile	0	1	4	----------	0	0	0	5
Montgomery	0	2	3	----------	----------	0	0	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	1	1	0	----------	----------	0	0	----------
Little Rock	0	1	3	----------	0	0	0	1
Louisiana:								
New Orleans	2	15	7	2	3	2	0	21
Shreveport	2	1	0	----------	0	0	0	3
Oklahoma:								
Muskogee	1	3	5	----------	0	2	0	0
Tulsa	0	6	1	----------	----------	2	0	----------
Texas:								
Dallas	26	18	9	----------	0	0	2	2
Fort Worth	3	7	11	----------	1	0	1	3
Galveston	0	1	8	----------	0	0	0	0
Houston	0	10	12	----------	0	1	0	8
San Antonio	4	6	5	----------	1	0	1	8
MOUNTAIN								
Montana:								
Billings	4	0	0	----------	1	0	0	4
Great Falls	4	0	0	----------	0	0	0	2
Helena	4	0	0	----------	0	0	0	0
Missoula	0	0	1	----------	0	0	0	1
Idaho:								
Boise	0	0	0	----------	0	0	0	0
Colorado:								
Denver	47	11	5	----------	0	9	11	9
Pueblo	3	1	0	----------	0	21	0	3
New Mexico:								
Albuquerque	6	1	0	----------	0	0	0	2
Utah:								
Salt Lake City	14	5	3	----------	2	2	0	6
Nevada:								
Reno	0	0	0	----------	0	0	0	1
PACIFIC								
Washington:								
Seattle	11	6	3	----------	----------	0	8	----------
Spokane	20	3	0	----------	----------	1	0	----------
Tacoma	1	3	12	----------	0	0	0	2
Oregon:								
Portland	16	12	0	1	0	3	2	2
Salem	0	0	1	----------	0	0	0	0
California:								
Los Angeles	9	43	27	34	3	3	14	20
Sacramento	2	3	1	----------	0	----------	7	2
San Francisco	27	17	4	1	0	1	8	4

City reports for week ended November 29, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	3	2	0	0	0	0	0	2	0	8	21
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	8
Manchester	2	0	0	0	0	0	0	0	0	0	22
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	0
Burlington	1	0	0	0	0	0	0	0	0	0	2
Massachusetts:											
Boston	64	50	0	0	0	12	2	2	0	15	204
Fall River	3	5	0	0	0	3	0	1	0	1	26
Springfield	5	4	0	0	0	1	0	0	0	2	32
Worcester	10	19	0	0	0	2	0	0	0	3	39
Rhode Island:											
Pawtucket	1	5	0	0	0	0	0	0	0	0	15
Providence	10	10	0	0	0	7	0	0	0	4	61
Connecticut:											
Bridgeport	8	4	0	0	0	0	0	0	0	0	19
Hartford	5	8	0	0	0	4	0	0	0	5	51
New Haven	4	2	0	0	0	1	0	0	0	6	32
MIDDLE ATLANTIC											
New York:											
Buffalo	23	20	0	1	0	2	1	0	0	15	124
New York	134	107	0	0	0	81	15	4	1	108	1,297
Rochester	8	34	0	0	0	1	0	0	0	15	57
Syracuse	10	7	0	0	0	1	0	0	0	8	47
New Jersey:											
Camden	4	1	0	0	0	1	0	0	0	0	34
Newark	14	13	0	0	0	9	1	0	0	19	89
Trenton	2	10	0	0	0	1	0	0	0	0	25
Pennsylvania:											
Philadelphia	71	77	0	0	0	27	3	2	1	29	398
Pittsburgh	36	57	0	0	0	7	0	0	0	5	162
Reading	1	0	0	0	0	3	0	0	0	1	25
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	16	15	0	0	0	5	1	0	0	1	119
Cleveland	34	57	0	0	0	9	1	3	0	6	160
Columbus	11	4	0	0	0	5	0	0	1	0	77
Toledo	12	7	0	1	0	1	1	0	0	0	51
Indiana:											
Fort Wayne	3	0	0	0	0	1	0	0	0	0	22
Indianapolis	13	37	3	2	0	3	0	0	0	9	85
South Bend	2	1	0	0	0	2	0	0	0	1	25
Terre Haute	4	0	0	0	0	2	0	0	0	2	29
Illinois:											
Chicago	108	131	1	0	0	43	3	2	1	37	641
Springfield	2	2	0	0	0	0	0	0	0	1	14
Michigan:											
Detroit	80	62	0	1	0	20	2	1	0	40	226
Flint	14	11	1	0	0	0	0	0	0	2	14
Grand Rapids	10	13	0	3	0	1	0	0	0	5	32
Wisconsin:											
Kenosha	0	6	1	0	0	0	0	0	0	2	8
Madison	1	6	1	0	--------	--------	0	0	--------	7	--------
Milwaukee	20	13	0	0	0	2	1	1	0	19	93
Racine	5	1	0	0	0	0	0	0	0	5	9
Superior	3	4	0	0	0	0	0	0	0	1	9
WEST NORTH CENTRAL											
Minnesota:											
Duluth	9	0	0	0	0	2	0	0	0	5	15
Minneapolis	48	10	1	0	0	8	0	0	0	4	87
St. Paul	24	1	2	0	0	8	0	0	0	6	53

City reports for week ended November 29, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—continued											
Iowa:											
Davenport	1	1	0	2			0	0		0	
Des Moines	11	4	1	4			0	0		0	20
Sioux City	2	4	0	0			0	0		0	
Waterloo	2	0	0	0			0	0		0	
Missouri:											
Kansas City	15	14	0	0	0	9	0	1	0	5	79
St. Joseph	3	3	0	0	0	0	0	0	0	0	21
St. Louis	32	27	0	0	0	3	2	3	1	3	179
North Dakota:											
Fargo	4	0	0	0	0	0	0	0	0	0	10
Grand Forks	2	0	0	0			0	0		0	
South Dakota:											
Aberdeen	0	0	0	1			0	0		0	
Sioux Falls	3	0	0	0			0	0		0	9
Nebraska:											
Omaha	5	8	1	29	0	2	0	0	0	0	52
Kansas:											
Topeka	3	1	1	0	0	0	0	0	0	3	21
Wichita	5	4	0	6	0	0	0	0	0	0	24
SOUTH ATLANTIC											
Delaware:											
Wilmington	3	4	0	0	0	0	0	0	0	0	36
Maryland:											
Baltimore	22	15	0	0	0	15	2	4	0	13	187
Cumberland	1	1	0	0	0	0	0	0	0	0	8
Frederick	0	1	0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	19	28	0	0	0	9	1	2	0	0	152
Virginia:											
Lynchburg	2	0	0	0	0	1	0	5	0	0	16
Norfolk	3	3	0	0	0	3	0	0	0	0	
Richmond	8	13	0	0	0	1	1	0	0	1	44
Roanoke	4	3	0	0	0	0	0	0	0	0	18
West Virginia:											
Charleston	2	2	0	0	0	0	1	0	0	0	9
Wheeling	2	3	0	0	0	0	0	0	0	0	14
North Carolina:											
Raleigh	1	5	0	0	0	2	0	0	0	0	13
Wilmington	1	0	0	0	0	0	0	0	0	1	10
Winston-Salem	3	1	1	0	0	1	0	0	0	0	19
South Carolina:											
Charleston	2	2	0	0	0	2	0	0	0	0	20
Columbia	0	2	0	0	0	0	0	1	0	0	14
Greenville	0	0	0	0	0	0	0	0	0	1	
Georgia:											
Atlanta	6	10	0	0	0	4	0	1	1	1	47
Brunswick	0	0	0	0	0	1	0	0	0	0	10
Savannah	1	3	1	0	0	2	1	2	0	0	36
Florida:											
Miami	1	1	0	0	0	5	0	0	0	0	23
St. Petersburg	0		0		0	0	0		0		11
Tampa	1	1	0	0	0	1	0	1	0	1	23
EAST SOUTH CENTRAL											
Kentucky:											
Covington	8	10	0	0	0	1	0	0	0	0	13
Tennessee:											
Memphis	6	7	1	0	0	8	1	2	0	4	80
Nashville	8	4	0	0	0	3	1	0	0	2	45
Alabama:											
Birmingham	4	8	0	0	0	4	1	0	0	3	64
Mobile	1	2	0	0	0	0	0	0	0	0	27
Montgomery	0	5	0	0			0	0		7	

City reports for week ended November 29, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	2	1	0	0	--------	--------	0	0	--------	0	--------
Little Rock	3	2	0	0	0	0	0	3	0	0	--------
Louisiana:											
New Orleans	9	14	1	0	0	6	1	1	1	2	139
Shreveport	2	2	0	0	0	0	0	0	1	0	35
Oklahoma:											
Muskogee	2	1	0	0	0	0	0	5	0	0	--------
Tulsa	3	8	1	0	--------	--------	0	0	--------	0	--------
Texas:											
Dallas	8	7	0	0	0	4	0	1	1	9	55
Fort Worth	2	7	0	0	0	0	0	0	1	0	28
Galveston	0	1	0	0	0	0	0	13	0	0	11
Houston	3	8	0	1	0	2	0	2	0	0	63
San Antonio	1	3	1	0	0	5	0	0	0	0	54
MOUNTAIN											
Montana:											
Billings	1	1	0	4	0	0	0	0	0	4	13
Great Falls	1	2	0	0	0	0	0	0	0	0	12
Helena	1	0	0	0	0	0	0	0	0	0	5
Missoula	0	0	0	0	0	0	0	0	0	0	6
Idaho:											
Boise	1	3	0	0	0	0	0	0	0	0	4
Colorado:											
Denver	12	16	0	0	0	6	0	0	0	3	78
Pueblo	2	0	0	0	0	0	0	1	0	5	8
New Mexico:											
Albuquerque	1	0	0	0	0	8	0	1	0	2	14
Utah:											
Salt Lake City	2	4	2	0	0	2	0	0	0	4	27
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	2
PACIFIC											
Washington:											
Seattle	9	13	1	0	--------	--------	1	0	--------	14	--------
Spokane	9	3	3	2	--------	--------	0	0	--------	2	--------
Tacoma	3	5	2	2	0	0	0	1	0	4	26
Oregon:											
Portland	8	5	4	1	0	0	1	1	0	0	63
Salem	0	1	0	0	0	0	0	0	0	0	--------
California:											
Los Angeles	32	7	2	0	0	18	1	1	0	17	267
Sacramento	3	4	1	0	0	3	0	1	0	7	26
San Francisco	15	9	1	0	0	10	0	0	0	23	197

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	0	1
Massachusetts:									
Boston	0	0	1	0	1	0	1	10	0
Worcester	0	0	0	0	0	0	0	2	0
MIDDLE ATLANTIC									
New York:									
New York	9	8	3	0	0	0	3	0	1
Rochester	1	0	0	0	0	0	0	0	0
New Jersey:									
Newark	2	0	0	0	0	0	1	0	0
Pennsylvania:									
Philadelphia	2	1	1	1	0	0	0	0	0
Pittsburgh	1	1	0	1	0	0	0	0	0

City reports for week ended November 29, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	0	0	0
Cleveland	3	1	0	0	0	0	0	5	1
Columbus	0	0	0	0	0	0	0	1	0
Indiana:									
Indianapolis	2	2	0	0	0	0	0	0	0
Terre Haute	0	1	0	0	0	0	0	0	0
Illinois:									
Chicago	5	1	1	0	0	0	1	4	1
Michigan:									
Detroit	1	2	1	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	1	0	0	0	0	0	0	0	0
Missouri:									
St. Louis	3	0	0	0	0	0	0	0	0
Nebraska:									
Omaha	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC [1]									
South Carolina:									
Charleston	0	0	0	0	4	0	0	0	0
Georgia:									
Atlanta	1	1	0	0	0	0	0	0	0
Savannah [1]	0	0	0	0	1	1	0	0	0
Florida:									
Miami	0	0	0	0	0	1	0	0	0
EAST SOUTH CENTRAL									
Kentucky:									
Covington	0	1	0	0	0	0	0	1	0
Tennessee:									
Memphis	0	0	0	0	0	0	0	1	0
Nashville	1	2	0	0	0	0	0	1	1
Alabama:									
Birmingham	0	0	0	0	1	0	0	1	0
Mobile	0	0	0	0	0	1	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	1	0	0	1	1	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Texas:									
Dallas	1	1	0	0	0	1	0	1	0
Fort Worth	0	0	0	0	0	0	0	1	0
Houston	0	0	0	0	0	1	0	0	0
San Antonio	0	0	0	0	0	0	0	1	0
MOUNTAIN									
Colorado:									
Denver	1	1	0	0	0	0	0	0	0
Utah:									
Salt Lake City	1	0	0	0	0	0	0	0	0
PACIFIC									
Oregon:									
Portland	1	0	0	0	0	0	1	0	0
California:									
Los Angeles	0	1	0	0	1	0	0	2	0
Sacramento	1	0	0	0	0	0	0	0	0
San Francisco	0	0	0	0	0	1	1	3	2

[1] Typhus fever: 4 cases, 2 cases at Baltimore, Md., and 2 cases at Savannah Ga.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended November 29, 1930, compared with those for a like period ended November 30, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities October 26 to November 29, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929
98 cities	91	143	[2] 84	156	91	159	[3] 102	[4] 186	89	139
New England	84	114	[5] 79	119	75	168	113	117	80	177
Middle Atlantic	47	99	35	104	46	112	54	123	50	123
East North Central	131	168	110	195	130	205	125	302	123	167
West North Central	91	160	[6] 75	200	104	165	[7] 89	169	108	114
South Atlantic	106	144	79	125	110	122	[8] 143	135	60	144
East South Central	331	205	243	219	209	232	310	239	155	157
West South Central	108	434	213	480	172	427	183	446	164	259
Mountain	34	17	120	61	26	44	26	[4] 89	77	17
Pacific	78	111	109	97	73	84	[9] 94	60	111	56

MEASLES CASE RATES

	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929
98 cities	61	38	[2] 58	44	93	56	[3] 69	[4] 72	109	74
New England	126	27	[5] 94	20	157	45	164	56	148	70
Middle Atlantic	29	33	35	20	71	26	80	34	73	33
East North Central	18	40	16	68	17	91	31	94	28	101
West North Central	288	52	[6] 275	94	491	50	[7] 17	81	636	100
South Atlantic	18	15	44	9	24	7	[8] 59	24	40	22
East South Central	47	0	94	7	20	14	169	14	74	0
West South Central	0	0	0	4	0	19	4	27	11	38
Mountain	403	244	223	61	300	252	318	[4] 107	275	131
Pacific	28	58	28	113	38	142	[9] 42	280	12	249

SCARLET FEVER CASE RATES

	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929
98 cities	165	155	[2] 172	191	191	205	[3] 200	[4] 218	178	212
New England	195	177	[5] 204	276	253	265	217	249	241	258
Middle Atlantic	139	89	140	102	133	135	168	127	156	116
East North Central	220	226	234	295	290	311	266	347	224	361
West North Central	159	160	[6] 137	187	140	139	[7] 199	223	137	183
South Atlantic	152	139	145	167	141	238	[8] 198	163	172	139
East South Central	277	205	331	178	310	157	236	157	243	137
West South Central	71	149	97	152	127	152	101	156	142	118
Mountain	335	226	275	357	378	226	275	[4] 267	223	348
Pacific	54	181	111	176	116	179	[9] 101	261	97	266

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930, and 1929, respectively.
[2] Hartford, Conn., and Waterloo, Iowa, not included.
[3] St. Louis, Mo., Atlanta, Ga., and San Francisco, Calif., not included.
[4] Reno, Nev., not included.
[5] Hartford, Conn., not included.
[6] Waterloo, Iowa, not included.
[7] St. Louis, Mo., not included.
[8] Atlanta, Ga., not included.
[9] San Francisco, Calif., not included.

Summary of weekly reports from cities October 26, to November 29, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued

SMALLPOX CASE RATES

	Week ended—									
	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929
98 cities	3	13	[2] 2	9	4	13	[3] 3	[4] 24	8	14
New England	0	0	[5] 0	2	0	25	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	1	20	4	15	2	22	0	33	4	13
West North Central	19	42	[6] 6	29	21	42	[7] 33	50	66	48
South Atlantic	0	0	0	0	0	0	[8] 0	2	0	0
East South Central	0	14	0	0	0	0	0	0	0	0
West South Central	4	27	7	8	4	4	4	38	4	11
Mountain	9	61	9	17	0	9	43	[4] 71	34	35
Pacific	17	29	7	19	21	31	[9] 7	111	9	75

TYPHOID FEVER CASE RATES

	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929
98 cities	14	11	[2] 11	9	15	8	[3] 15	[4] 13	10	5
New England	4	7	[5] 5	11	22	22	15	11	11	2
Middle Atlantic	10	8	5	8	4	3	5	10	3	2
East North Central	8	6	9	6	5	6	9	9	4	5
West North Central	13	17	[6] 4	12	19	4	[7] 22	12	8	6
South Atlantic	29	13	29	13	31	9	[8] 26	19	29	4
East South Central	115	34	27	21	54	14	13	34	13	34
West South Central	15	19	30	11	93	8	90	34	75	15
Mountain	0	78	17	17	26	44	51	[4] 36	9	26
Pacific	21	2	19	7	12	10	[9] 13	5	7	2

INFLUENZA DEATH RATES

	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929
91 cities	9	11	[5] 9	8	10	9	[10] 10	[4] 8	9	11
New England	2	2	[5] 2	4	4	9	7	4	2	4
Middle Atlantic	9	9	13	8	9	4	8	9	11	5
East North Central	6	9	6	8	9	9	5	6	7	10
West North Central	9	6	3	3	6	3	6	9	0	21
South Atlantic	16	19	9	4	5	11	[8] 16	4	9	17
East South Central	15	30	29	37	44	22	15	30	29	15
West South Central	23	27	15	12	31	31	38	16	15	55
Mountain	17	26	9	0	9	26	60	[4] 9	26	17
Pacific	3	3	9	16	6	9	[9] 10	6	9	13

PNEUMONIA DEATH RATES

	Nov. 1, 1930	Nov. 2, 1929	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929
91 cities	101	105	[5] 104	105	118	98	[10] 120	[4] 101	112	106
New England	95	74	[5] 82	119	104	88	115	88	71	92
Middle Atlantic	115	113	122	115	136	103	140	106	125	101
East North Central	88	101	75	78	86	71	83	96	78	84
West North Central	95	135	86	108	77	120	136	102	92	126
South Atlantic	123	116	139	137	157	107	[8] 137	94	165	129
East South Central	74	157	155	90	214	231	199	254	155	224
West South Central	111	105	119	125	111	121	123	129	165	156
Mountain	163	131	189	131	215	157	163	[4] 107	223	157
Pacific	40	31	52	72	83	85	[9] 76	28	86	104

[2] Hartford, Conn., and Waterloo, Iowa, not included.
[3] St. Louis, Mo., Atlanta, Ga., and San Francisco, Calif., not included.
[4] Reno, Nev., not included.
[5] Hartford, Conn., not included.
[6] Waterloo, Iowa, not included.
[7] St. Louis, Mo., not included.
[8] Atlanta, Ga., not included.
[9] San Francisco, Calif., not included.
[10] Atlanta, Ga., and San Francisco, Calif., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended November 29, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended November 29, 1930, as follows:

Province	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]				
Nova Scotia	2			1
New Brunswick				5
Quebec	3			22
Ontario	1	6	12	6
Manitoba				2
Saskatchewan				2
Alberta [1]				
British Columbia		2		
Total	6	8	12	38

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended November 29, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended November 29, 1930, as follows:

Disease	Cases	Disease	Cases
Chicken pox	192	Ophthalmia neonatorum	1
Diphtheria	79	Paratyphoid fever	1
Erysipelas	6	Scarlet fever	158
German measles	3	Tuberculosis	47
Influenza	3	Typhoid fever	22
Measles	91	Whooping cough	79
Mumps	100		

Quebec Province—Vital statistics—August, 1930.—Births, deaths, and marriages for the month of August, 1930, in the Province of Quebec, Canada, with deaths from certain specified causes, are shown in the following table:

Estimated population	2,735,000	Deaths from—	
Births	6,477	Influenza	11
Birth rate per 1,000 population	27.9	Lethargic encephalitis	2
Deaths	2,723	Measles	5
Death rate per 1,000 population	11.7	Pneumonia	92
Marriages	1,926	Poliomyelitis	4
Deaths under 1 year	888	Scarlet fever	6
Deaths under 1 year per 1,000 births	137.1	Syphilis	15
Deaths from—		Tuberculosis (pulmonary)	175
Cancer	194	Tuberculosis (other forms)	46
Diabetes	16	Typhoid fever	15
Diarrhea	401	Violence	145
Diphtheria	15	Whooping cough	29
Heart disease	241		

CUBA

Habana—Communicable diseases—November, 1930.—During the month of November, 1930, certain communicable diseases were reported in the city of Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	4	1	Paratyphoid fever	1	
Diphtheria	8	2	Scarlet fever	12	
Leprosy		1	Tuberculosis	28	3
Malaria [1]	21	1	Typhoid fever [1]	19	3

[1] Many of these cases are from the island outside of Habana.

MEXICO

Tampico—Communicable diseases—November, 1930.—During the month of November, 1930, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	2	2	Malaria	255	9
Enteritis (various)		47	Smallpox	2	
Influenza	3	1	Tuberculosis	22	21
Leprosy	1		Whooping cough	10	1

PORTO RICO

San Juan—Communicable diseases—Five weeks ended November 22, 1930.—During the five weeks ended November 22, 1930, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	5	Tetanus	4
Malaria	20	Typhoid fever	5
Measles	1	Whooping cough	21

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	Dec. 6, 1930
Afghanistan	C		[1] P	P												
China:																
Amoy	C				2											
	D				2											
Canton	C	2	2				1			1						
	D		1													
Shanghai	C				34	23	5	6	4	1		1				
	D				3	2			2							
Shensi Province	C				P											
Swatow	C	7		3	2											
Tientsin	C			2	1											
India	C	37,102	26,121	42,893	51,551	11,109	10,172									
	D	25,711	13,822	22,358	23,959	5,225	4,808									
Bassein	C				1											
Bombay	C			14	1	1	3	1	11	17	1	1		2		
	D			8	2	1	2		8	10	6	1		2		
Calcutta	C	327	220	63	27	4	4	7	9	7	7	11		4		
	D	179	128	30	12	3	4	4	4	4	2	6		4		
Madras	C			1				2			1					
	D			1				2								
Negapatam	C	1														
	D	1														
Rangoon	C	6	1	1	2			1								
	D	4	1	1	1			1								
Tuticorin	C								1				1	4		
	D								1				1			
India (French):																
Chandernagor	C	3	1		1		1	2								
	D	2					1									
Karikal	C	3														
	D	3														
Pondicherry	C							1								
	D							1								

India (Portuguese)	C			1	1											
Indo-China (see also table below):																
Pnompenh	C	40	32	11		1		1		1						
	D	18	22	6												
Saigon and Cholon	C	48	10	5		1	1			1					1	
	D	23	3	1											1	
Philippine Islands: [2]																
Ports—																
Cebu	C	1	65	9	2											
	D		36	8	2											
Iloilo	C		29	64	10	1									1	
	D		22	56	14	2			2						3	
Manila	C			1	43	2	1	2								
	D				12		1									
Provinces—																
Antique	C			20	47	12		28								
	D			12	34	8		10								
Bohol	C			138	49											
	D			79	20											
Bulacan	C	3	4	1	4		2									
	D	1			2		1									
Capiz	C		3	2	1											
	D		2	2												
Cebu	C	355	713	85	25											
	D	170	303	50	11											
Iloilo	C	2	309	571	238	18	7	13	12	10	10	4	6	11	21	13
	D	1	193	376	151	15	6	7	12	7	7	3	6	8	11	8
La Union	C		1													
Leyte	C	47	1													
	D	19	11													
Masbate	C	10	92	34												
	D	3	35	14												
Misamis, Occidental	C		3													
	D		3													
Negros, Occidental	C	140	568	343	122	8	10	5	5	12	3	19	22	41	38	48
	D	88	368	237	91	6	5	6	3	12	3	12	14	33	17	45
Negros, Oriental	C		23	8												
	D		13	4												
Nueva Acija	C		1													
	D		1													
Pampanga	C	2	2		1											
Pangasinan	C		3	1												
	D		2	1												
Rizal	C	1	1													
	D											4				
Samar	C			18	4	4			3	6	3	4	3	4	4	
	D			16	2	4			3	5	1	4	2	4	4	
Sorsogon	C											5				
	D	1	1									4				

[1] An outbreak of cholera was reported in June, 1930 in Afghanistan.
[2] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	Dec. 6, 1930
Philippine Islands—Continued.																
Provinces—Continued.																
Surigao	C			28	1	(1)										
	D			17	2											
Tarlac	C			1												
Siam	C	27	20	3				1	3	3		1			1	
	D	19	9	2					1	3		1				
Bangkok	C	12	8	1				1	2	1	2			2		
	D	5	3	1				1	1	1	1			2		
Songkla	C		10													
	D		6													
On vessel:																
S. S. Malwa from Shanghai	D				1											
On small boat at Port Cebu, from Bantayan Island	C	1														
	D	1														

Place		May, 1930	June, 1930	July, 1930	August, 1930: 1-10	11-20	21-31	September, 1930: 1-10	11-20	21-30	October, 1930: 1-10	11-20	21-31
Indo-China (French) (see also table above):													
Annam [2]	C	23	16	1		3							
Cambodia [2]	C	88	144	43	37	22		23	13	2	16		6
Cochin-China [2]	C	671	273	46	22	5		9	6	18	14	6	8

[1] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.
[2] Reports incomplete.

PLAGUE

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 30, 1930	Week ended— September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29
Algeria:																		
Algiers	C		3	7	1	2	6	2	1	1	2	2	5	3	1	2		
	D												3					
Constantine	C	1	1												1			
Oran	C		3	4	1	2	3	4		4	4	2	1			1		
	D						1				2	1						
Plague-infected rats			2			10			2			4	1					
Philippeville	C					1			1		1	1	1		1			
Belgian Congo	C		2	2	2	3										1		
	D		2	2		3												
British East Africa (see also table below): Uganda	C	406	228	236	44	40	57	61	65	18	32							
	D	328	213	229	37	39	55	60	65	18	32							
Canary Islands: Las Palmas	D			1														
Ceylon:																		
Colombo	C	1	3	2	2				1	1		1				1	1	
	D	1	3	2	3				1	1		1				1	1	
Plague-infected rats		1	1													1	1	
China:																		
Manchuria—Tungliau and Nungan	C			30			29	P	2									
Shensi	C							P					P					
Dutch East Indies:																		
Batavia and West Java	C	98	84	83	13	14	26	26	22	14	26	45	41					
	D	98	84	83	12	14	26	24	22	14	26	41	42					
Plague-infected rats		4		1		1	1	1										
Java and Madura	D	202	217	188	55	54	67	84	75	68	95	97	124					
Ecuador (see table below).																		
Egypt:																		
Alexandria	C	19	23	11	3	3	2	2	2	1	3	3	2	1	1	3		1
	D	9	10	6	5	1	2		3	1	1	1	3		2	2		
Assiout	C	9	2												3			2
	D	3	2												1			
Beni-Suef	C			1														
Dakahlieh	C	1																
Gharbieh	C			3														
	D			1														
Girga	C		1		1													
Minieh	C	10	3															
	D	1																
Port Said	C	2	1	1									1					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 30, 1930	Week ended— September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29
France:																		
Marseille	C				2	2	1					4	2	1		1		
St. Ouen	C		1															
	D		1															
Gambia	C			4														
	D			4														
Greece (see also table below):																		
Patras	C	1	1															
Pyrgos	C									2								
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats		1																
India	C	240	377	877	593	600	704	600	672	527								
	D	187	256	477	262	291	328	251	250	222								
Bassein	C				1		1							1				
	D				1		2											
Bombay	C	3	1			1			1			1	1					
	D	2	1			1				1		1		1				
Plague-infected rats		26	52	35	12	9	11	15	21	13	16	14	2	9	11	8	11	
Madras Presidency	C	39	47	81		47	41	39	41	59	46	50						
	D	22	31	34		23	13	21	14	32	31	33						
Rangoon	C	1	2	3	2	1	5	2	2					1		1		
	D	1	2	2	2	1	4	2	2					1				
Plague-infected rats		1	6	7	2		2	4		1			1				1	
India (Portuguese)	D			P										3				
Indo-China (see also table below):																		
Pnompenh	C	6	2	4	2	1			1	1							1	3
	D	7	2						1	1	1		1				1	3
Saigon and Cholon	C	2		1		1			1									
	D	1																
Iraq: Baghdad	C	28	18	9					1									
	D	15	7	3					1									
Kwang-Chow-Wan	C	51	4	1														
Madagascar (see also table below): Tamatave	C	1	1	2		1	P			1			3		2			
	D									1			3					
Morocco	C	3	1	15									4		1			
	D	4		2														

Nigeria: Lagos	C	5	1	7	1	1	3	1		3		2	33	1	2	2		
	D	5	1	7	1	1	3	1		3		2		1	2	2		
Plague-infected rats		11	18	8		4	2	4				11	3					
Senegal (see table below).																		
Siam	C			7	3								3	1	1			
	D			6	2								3	1				
Bangkok	C			3														
	D			2														
Nagara Rajsima	C			2		1						1				1		
	D			2		1						1				1		
Syria: Beirut	C	12	9	2	3	2							1		3	1		
Tripolitania	C			2													4	
Tunisia:																		
Sfax district	C	9	6	1														
Tunis	C	1	5											1		1		
	D	1	1															
Union of Socialist Soviet Republics:																		
Salsk Region	C	2	5	7														
	D	1	4	5														
Stavropol Region	C	1																
	D	1																
Union of South Africa:																		
Cape Province	C	1	1	1				1					1					
	D		1	1			1											
Orange Free State	C				1		1											
	D				1		1											

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	107	97	87	53	50
Ecuador: Guayaquil	C	0	0				
	D	0	0				
Plague-infected rats		0	0				
Greece (see also table above)	C		1				
Indo-China (see also table above)	C		11	1	2	4	
Madagascar (see also table above):							
Ambositra Province	C	1					
	D	1					
Antisirabe Province	C	19	3	24	11	21	
	D	19	3	24	11	21	
Miarinarivo Province	C	5	1	1	2	7	
	D	5	1	1	2	7	
Moramanga Province	C	1	3		27	18	
	D		3		27	17	

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
Madagascar (see also table above)—Con.							
Tananarive Province	C	15	16	28	39	79	
	D	14	16	28	38	79	
Senegal:							
Baol [1]	C	13	2	62	79	48	53
	D	11	2	48	20	23	35
Dakar [1]	C	52	53	140	108	3	
	D	42	117	122	90	8	
Louga [1]	C	54	60	138	75	61	37
	D	27	21	103	33	30	25
Thies [1]	C	21	52	54	34	12	24
	D	8	35	30	20	4	15
Tivaouane [1]	C	135	43	119	110	20	53
	D	69	28	70	54	14	31

[1] Incomplete reports.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 30, 1930	Week ended— September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29
Algeria:																		
Algiers	C		1	3														
Constantine	C	1	1												1			
Arabia: Aden	C		1															
Brazil: Rio de Janeiro	C														2			
British East Africa (see also table below):																		
Tanganyika	C	1,610	168	242	198	288		36	27	43	4	21	3					
	D	301	42	37	4	55		1	1		1	4	1					
British South Africa: Southern Rhodesia	C	79	31	1	1				14	39	98	2	2					
Canada:																		
Alberta	C		5	1				1		13	8	1					1	
British Columbia—Vancouver	C	2	6	6			1	1	1			1		3				
Manitoba	C	4			1													
Ontario	C	47	24	20	2	2	6		1		3	15		20	9		7	12
Ottawa	C	15	13	7	2	1	2						14		9	14		8
Toronto	C	4	1				1											2
Quebec	C	4	3	5													1	
Montreal	C			7														
Saskatchewan	C	22	5	8			1			3				2			2	
China:																		
Changking	C	1	P	P	P	P	P	P	P	P	P	P	P	P				
Foochow	C	P	P	P		P		P		P								
Hong Kong	C	4	2															
	D	3	1															
Manchuria—																		
Harbin	C	4	3	2														
Kwantung—Dairen	C	10	8														1	
	D	1																
Nanking	C	P	P	P	P	P	P	P	P	P	P	P	P	P				
Shanghai—																		
Foreigners only	C	5	4	3			18					1	1		1			
Including natives	D	3					2									1		
Swatow	D	1	1	4	1	1			1			3	1	1		1		
Tientsin	C								1									

Chosen (see table below).																		
Colombia:																		
Barranquilla	C			2														
Buenaventura	C	6	10	2														
Cali	D									1		1						
Costa Rica: Port Limon	C	2																
Curacao (alastrim)	C	1	2	1														
Dutch East Indies:																		
Borneo	C	12	2															
	D	1																
Java—																		
Batavia and West Java	C	13	8	12	2	5	2	2	10	2	1	1	2					
	D	3	5	5	2		1	1	1	1	1	1	2					
East Java and Madura	C		1															
Sanggi Islands	C		11	36	14													
	D		3	2	3													
Egypt: Port Said	C		3															
France (see table below).																		
Great Britain:																		
England and Wales	C	926	529	344	99	106	75	61	82	74	44	125	86	87	92	107		
Ashton under Lyne	C	7	8															
Bradford	C		1							1	1	1	1	1				
Cardiff	C		2										1					
Leeds	C		1										1			2		
London	C	498	250	178	43	44	36	41	30	34	23	33	29	32	41	47		
London and Great Towns	C	753	408	285	79	84	51	54	55	56	32	80	52	58	68	82		
	D										1			1				
Stoke-on-Trent	C	32	9	2			1	1			1			1				
Scotland	C	4	1			5												
	D		1															
Honduras: Naco	C						5											
India	C	12,962	7,630	4,877	830	940	610	751	611	528								
	D	3,531	2,348	1,246	202	209	119	150	202	122								
Bombay	C	113	50	12	2	1	1	2			1							
	D	79	33	10	2	1	2											
Calcutta	C	161	73	25	4	5	3	2	3	4	3	2	2	4	3		3	
	D	146	56	21	3	4	1	1	3	4	3	1	2	2	3		3	
Cochin	C	16	6	14	1	1		1			8	4	3	5	10	7	4	
	D	4			1						1		1			2	2	
Karachi	C	7	1	4			1	3									2	
	D	3		3				2										
Madras	C	35	49	38	9	11	6	8	4	4	8	3	2	1	2	4	3	
	D	10	12	11	1	1	1	3	1	2	3	2			2			
Moulmein	C	21	18	2	1													
	D	7	1	1			1											
Negapatam	C	2	4	4	1	2		6	4	2	5	3	2	2	2	3	3	
Rangoon	C	9		3								2			5			
	D	2																
Tuticorin	C	1										1						
Vizagapatam	C	1									1							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930: 6	13	20	27	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29
India (French):																		
Chandernagor	C	19	4				1	2			3			3				
	D	3	3			1	1				1			1				
Karikal	C	11	2	9		5			1									
	D	8	2	9		2			1									
Pondicherry Province	C	23	26	22	11	7	7	10	11	10	6	11	1	2				
	D	23	25	22	11	7	7	8	11	8	6	11	1	2				
India (Portuguese)	C	28	1	9	1	2		1										
	D	10	1	2														
Indo-China (see also table below):																		
Pnompenh	C		1								2							
	D	1	1	1														
Saigon and Cholon	C	1		1	1									2			2	
	D			3	1									2			1	
Iraq:																		
Baghdad	C	1	3	1				1		2								
	D		1	1														
Mossoul Liwa	C	4	67						63		4	2			6		7	9
	D	1	20						27								1	1
Ivory Coast (see table below).																		
Mexico (see also table below):																		
Jalisco (State) Guadalajara	D	15	4	1						2		1	1		1	1	1	
Juarez	C	6		2														
	D	1		1					1				1					
Mexico City and surrounding territory	C	77	37	10	7	2	1	2	1	3	5	4	1	3				
	D	17	8	6	1	1	1	2			1	2	1					
Progreso	D	1																
Vera Cruz	C													1				
Morocco (see table below).																		
Nigeria: Lagos	C	1																
Poland	C	2												3				
Portugal:																		
Lisbon	C	10	13	50	7	8		12	4	5		7	12			8	11	
Oporto	C			1														

Siam	C		6							1								
	D		3															
Somaliland, British: Boales	C									1					1			
	D									1								
Spain	C	12	5	2		4	1						14	5	11			
Straits Settlements	C	9	11	8	1	2	2	1	1	1	1	2	3	3	4		3	
	D	2	3	3		1					1			1	1		1	
Sudan (Anglo-Egyptian)	C	67	12	42	102	5	20	1	25	1	53		3			2		3
	D	3	1	3	50	2			2		5					1		
Sudan (French) (see table below).																		
Switzerland: Berne Canton	C		1	2					1									
Syria (see table below).																		
Tunisia: Tunis	C	2	1					2										
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C		P			P	P	P			P	P	P					
Orange Free State	C		P	P										1				
Transvaal	C			P	P	P	P	P	P		P	P	P					
Upper Volta	C	13																
On vessel: S. S. Manoa, from Honolulu to San Francisco	C		1															

Place		May, 1930	June, 1930	July, 1930	August, 1930			September, 1930			October, 1930		
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (see also table above)	C	305	213	233	59	34		54	52	86	32	62	164
Ivory Coast	C												4
Sudan (French)	C	274	76	34			39		P			17	
	D	32	18				3					2	
Syria: Beirut	C	7	7	2	1								

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	142	186		424	
Uganda	C	78					
	D	69					
Chosen	C	107		3	2		
	D	35					
Seishin	C	2	1	2			
	D	1					

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
France	C	51		1			
Mexico: Durango (see also table above)	D	4	3	3	3	2	
Morocco	C	18	5	3	8	1	4
Turkey	C	16					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		May 4-31, 1930	June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930				October, 1930				November, 1930			
							6	13	20	27	4	11	18	25	1	8	15	22
Algeria:																		
Algiers	C	15	3	6	2		3									1		
Constantine Department	C	6	12	2	3						2			1				
Oran	C	3	4	3	1	1						1	2					
Bolivia: La Paz.[1]																		
Bulgaria	C	6	16	10	1		2	2		2		1	3			1	2	
	D	2	1	1														
China:																		
Manchuria—Harbin (see also table below)	C	13	8	2	2	2							1					
Shanghai	C				1													
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C		1	1	1		1	1	1	1							2	
Beheira Province	C	49	45	15					1									
	D	13	4	2														
Cairo	C				7			1										
Port Said	C				4		1				1			1				
Great Britain: Scotland—																		
Dunfermline	C			1														
Glasgow	C	1																
	D	1																
Greece (see table below).																		
Ireland:																		
Irish Free State—																		
Galway County—Oughterard	C			2														
Leitrim County—Mohill	C		9	1														
Mayo County—																		
Ballina	C	2	1	1														
Castlebar	C				1													
Swinford	C	14																
Westport	C			2	1													
Roscommon County—																		
Roscommon	C			1														
Strokestown	C			1														
Wicklow County—Shillelagh	C		4	2														

Latvia (see table below).																		
Lithuania (see table below).																		
Mexico:																		
Durango	D								1	1		1						
Mexico City, including municipalities in Federal District	C	6	9	5	9	2	2	3				3	5	1	1			
	D	3	1		2		1	1				2		1				
Morocco	C	11	15	11	8		2							1		1	1	
	D												1					
Palestine	C	2	2	6	3		1	1	1		1	1	1			2	1	1
Poland	C	171	117	36	34	2	3	6	12	3	6	6	7	7	8	15	7	
	D	5	11	4	3		1			1			1					
Portugal: Oporto	C				1						1	1	1		2	1	1	2
Rumania	C	227	58	28	9	1		1	2	3	4		6					
	D	35	5	8	2													
Spain	C		3	3				1				1	1			4		
	D			1				1				1	1					
Tunisia	C	6	18	24	10	1	1		4	1	1	1	9					
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P				
Muncipality of East London	C			1					2			1						
Natal	C	P	P	1	P			P			P	P	2	P				
Orange Free State	C	P	P	P	P	P	P	P	P									
Transvaal	C			P	P	P	P	P	P	P	P	P	P	P				
Yugoslavia (see table below).																		

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930	Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
China: Harbin (see also table above)	C	240		11	5			Lithuania	C	27	16	18	7	24	1
Chosen: Seoul	C	43	2	3	2	1			D				1	2	
Czechoslovakia	C	12	1		1			Turkey	C	16	2	7	2		
Greece: Athens	C	3	3	6	6	4	2	Yugoslavia	C	16	6				
Latvia	C	3	3	3	1	2			D	1					

[1] 12 deaths from typhus fever were reported in La Paz, Bolivia, from Jan. 1 to May 31, 1930

YELLOW FEVER

	Cases
Brazil:	
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2
Gold coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	1

UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

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PUBLIC HEALTH SERVICE

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DECEMBER 26 - - 1930

SPECIAL ARTICLES

Health and Hospital Services in Alameda County, Calif.
Biochemical Studies on the Antineuritic Vitamin

UNITED STATES
GOVERNMENT PRINTING OFFICE
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UNITED STATES 'UBLIC HEALTH SERVICE

HUGH S. CUMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

ASST. SURG. GEN. R. '. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS ai issued weekly by the United States Public Health Service through its Division f Sanitary Reports and Statistics, pursuant to acts of Congress approved Februry 15, 1893, and August 14, 1912.

They contain: (1) Current informtion of the prevalence and geographic distribution of preventable diseases in te United States in so far as data are obtainable, and of cholera, plague, smallpx, typhus fever, yellow fever, and other communicable diseases throughout t world. (2) Articles relating to the cause, prevention, or control of disease. 3) Other pertinent information regarding sanitation and the conservation of pulic health.

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PUBLIC HEALTH REPORTS

VOL. 45 DECEMBER 26, 1930 No. 52

SUMMARY OF A STUDY OF HEALTH AND HOSPITAL SERVICES IN ALAMEDA COUNTY, CALIF.[1]

By JOSEPH W. MOUNTIN, *Surgeon, United States Public Health Service*

Introduction

The county board of supervisors of Alameda County, Calif., on behalf of the several health organizations, requested the Surgeon General of the United States Public Health Service, through the State Board of Health of California, to detail an officer to conduct a study of health and hospital services supported in whole or in part by public funds. This survey was made by the writer during the period February 11–April 9, 1930.

The primary objects of the survey were to determine the quantity and quality of the work being performed; and the efficiency and adequacy of the service. Particular attention was given to those agencies supported in whole or in part by public funds and whose work for the most part was devoted to either the protection of the public health or the care of the ambulatory sick. Other agencies participating in or bearing a relationship to these functions were reviewed in less detail. The study was conducted from the administrative point of view, considering the needs of the county as a whole, rather than the determination of the merits of an individual institution or item of service.

CHARACTERISTICS OF THE COUNTY

Alameda County is situated on the eastern, or continental side of San Francisco Bay and comprises for the most part what is generally termed the East Bay district.

[1] The complete report of this study has been published by the Alameda County Tuberculosis Association.

Estimated population of county by area, 1929

City	
Oakland	281, 000
Berkeley	72, 600
Alameda	34, 000
Albany	3, 000
Emeryville	3, 000
Hayward	4, 200
Livermore	2, 300
Piedmont	5, 500
Pleasanton	1, 100
San Leandro	7, 000
Unincorporated area	26, 500
Total Alameda County	440, 200

Of the total population, 91.4 per cent is classed as urban and 8.6 per cent rural. About 400,000 inhabitants live in a strip of territory varying from 3 to 5 miles wide extending the entire width of the county along San Francisco Bay. In this section are located the cities of Albany, Berkeley, Emeryville, Piedmont, Oakland, Alameda, San Leandro, and Hayward, and a number of unincorporated communities. These cities in the order mentioned, from north to south, form a continuous urban area separated only by imaginary lines called political boundaries. In so far as the social and economic structure of the area is concerned, these cities form a continuous urban community. The rural population, too, is concentrated in the lower bay area and in the valleys extending to the east.

Summary of Findings and Major Recommendations

PRESENT STATUS OF PREVENTIVE WORK

In Alameda County there are 11 legal health jurisdictions—Oakland, Berkeley, Alameda, Albany, Piedmont, Emeryville, San Leandro, Hayward, Pleasanton, Livermore, and the unincorporated portions of the county, each under the charge of a duly appointed health officer. The health officer of Berkeley is trained in public health work and serves on a full-time basis. The health officer of Hayward is a veterinarian serving on a part-time basis. In each of the other jurisdictions the health officer is a practicing physician, for the most part without any particular training for the position and devotes but a small part of his time to public health work. Within most of the health jurisdictions the schools maintain a separate health service, which may or may not be coordinated with other health activities. Superimposed upon this structure there are nine health centers. The health centers in Berkeley, Oakland, and Alameda are essentially clinics for the treatment of the sick, and only from 15 to 20 per cent

of the work may be classed as preventive in purpose or effect. The health centers of the remainder of the county serve primarily as headquarters for the local public health nursing service. The expenditures for health service, both gross and per capita, are as follows: Oakland, $300,312.94, or $1.07 per capita; Berkeley, $70,342.32, or $0.97 per capita; Alameda City, $34,671.43, or $1.02 per capita; remainder of county, $61,490.62, or $0.78 per capita—making a grand total of $466,817.31, or $1.06 per capita. Of the total expenditure for public health in the county as a whole, the county government bears 13.39 per cent, the cities 50.85 per cent, the schools 16.73 per cent, and 19.03 per cent comes from miscellaneous sources. Public health work in the three large cities, rated according to the appraisal form of the American Public Health Association, scores as follows: Oakland, 629.18; Berkeley, 752.48; and city of Alameda, 637.79—each rated on the basis of a possible 1,000 points. In the remainder of the county the records were not of such a character that work could be appraised by any objective method of measurement.

The prevention of disease, to a very large extent, is a public responsibility and for many years has been accepted as a function of government. The principal elements in a modern health program are as follows:

Collection and analysis of vital statistics.
Environmental sanitation.
Control of food, milk, and water supplies.
Control of acute communicable diseases.
Control of tuberculosis, venereal diseases, and other chronic and communicable diseases.
Hygiene of maternity and childhood.
Industrial and adult hygiene.
Laboratory service.
Public health education.
Other essential public health services suited to the locality.

To carry out such a program involves the employment of physicians, nurses, and sanitarians and the establishment of facilities with respect to clinics and laboratories.

There are four essential principles upon which a community public health service should be founded; namely,

(1) The area should be a political and a taxing unit with definite legal status.

(2) The basic health organization should be a part of governmental structure.

(3) The health organization should have at its disposal sufficient funds to provide trained personnel capable of rendering an inclusive type of service and one of sufficient intensity to accomplish definite and tangible results.

(4) All public health personnel working the area should be an integral or coordinated part of one organization and serve under one directing head who should be an official health officer. At least the basic personnel should devote full time to the work.

Only in Berkeley does health administration conform in any great degree to these principles; yet, the social, economic, and geographic conditions of the county are such that no one unit of the population can be separated from another. A union is being effected, however, on a functional basis. Water is obtained from the East Bay municipal utility district; the Oakland Health Department performs the milk and meat inspection for most of the municipalities; and the county finances a number of the medical services, some of which are to a certain extent preventive in character. Other health problems continue to be considered as confined within political boundaries or affecting selected units of the population. The public expenditure for prevention is $1.06 per capita, while the public expenditure for treatment is $3.17. The public expenditure for prevention represents the entire amount devoted to prevention, while the public expenditure for treatment is supplemented by possibly $20 per capita from private sources.

In general, it may be said that a fair amount of preventive work is being accomplished and in some instances it is of a high character; but from the point of view of the county as a whole, the service is inadequate. It lacks professional direction and coordination, and, in most instances, positive accomplishments are not commensurate with expenditures.

PRESENT STATUS, TREATMENT OF THE SICK

The great bulk of medical service to the sick in Alameda County, as elsewhere, is rendered by the private physicians and private hospitals. The care of the sick poor, however, is a public function, and by law this duty has been imposed on the county. The elements in a complete program are as follows:

(1) Hospital care of the acutely ill.

(2) Hospital care for persons convalescing from acute illness.

(3) Hospital care for those with chronic diseases, including tuberculosis.

(4) Care of the ambulatory sick.

(5) Care of persons in their homes.

HOSPITAL CARE

The county provides hospital care through the following institutions:

Highland Hospital for the acutely sick. Bed capacity: Medical, 68; surgical, 164; children, 32; emergency, 5; maternity, 25; contagious, 60; psychopathic, 15; reserve, approximately 100. Total active service, 369.

Fairmont Hospital for convalescent patients discharged from Highland, for the chronically sick, including those with advanced tuberculosis, and the indigent aged. Bed capacity: Chronic and convalescent patients, 225; tuberculosis, 125; and 410, mostly in dormitories, for the aged and infirm. Total, 760.

Arroyo Sanatorium for tuberculosis patients presenting a possibility of arrest. Bed capacity: Adults, 140; children, 40. Total, 180.

Del Valle Farm for children between ages 6 and 12 years predisposed to tuberculosis. Total capacity, 84 beds, including four for contagious diseases.

The management of these institutions is vested in the county institutions commission. The medical director of Alameda County institutions is the executive officer of the commission and is in general charge of all institutions. He also acts as resident superintendent of Highland Hospital. The other hospitals are under the direction of a resident superintendent. Highland and Fairmont Hospitals and Arroyo Sanatorium are supported by the county, while Del Valle Farm is supported by the county tuberculosis association and local community chests.

EMERGENCY SERVICE

The county provides emergency treatment service at the County Receiving Hospital, at Highland Hospital, and to a limited extent at Fairmont Hospital. The facilities other than those provided at Fairmont Hospital are used almost exclusively by the city of Oakland. The cities of Alameda and Berkeley make additional provision for local emergency treatment. The Receiving Hospital and, technically speaking, the emergency work at other county hospitals are under the county emergency surgeon. The major emergency work is gradually being transferred to Highland Hospital, and the Receiving Hospital now confines its activities principally to first aid and care of minor accidents.

CARE OF THE AMBULATORY SICK

The treatment of the ambulatory sick is the major function of the health centers in Oakland (including the out-patient department of Baby Hospital), Berkeley, and Alameda. A very limited amount of treatment is done at the San Leandro and Hayward health centers. In the health centers of Livermore, Pleasanton, and Washington

Township, the program is purely preventive in character. In all instances, however, health center personnel assist in bringing patients to medical attention.

All health centers are organized and administered along essentially the same lines. They are local institutions under the charge of local self-perpetuating boards, but supported very largely by the county. A recently created county health-center board is bringing about a certain amount of uniformity in procedure, particularly in the matter of records, reports, and accounting. There is no definite staff connection between the health centers and the hospitals and no direct line of authority.

The number of visits made to the health centers for treatment purposes during 1929 was as follows: Oakland health centers (Clinic Building and Ethel Moore Clinics), 65,617 visits; Baby Hospital out-patient department, 19,617 visits; Berkeley Health Center, 34,672 visits; Alameda Health Center, 15,943 visits; San Leandro Health Center, 1,076 visits; Hayward Health Center, 1,005 visits. The total cost of operating those health centers which devote the major part of their activities to treatment, namely Oakland, Baby Hospital out-patient department, Berkeley, and Alameda was $237,872.43, of which the county paid 64.19 per cent, the cities 11.52 per cent, and 24.28 per cent was derived from other sources.

HOME CARE OF THE SICK

County physicians.—The county physicians render home care to the sick poor and determine medical eligibility for admission to the county institutions. In supervisorial districts 2, 3, 4, and 5, two physicians for each district are appointed by the county board of supervisors. In district 1, any physician may accept the call. Physicians are paid at the rate of $2.50 per home call and $2 per office call. The total amount must not exceed $150 per month for any one physician except in district 1 where the amount is not specified. The total cost of the service for 1929 was $14,202, but the budget now in effect contains an item of $17,000 for this purpose. This service is charged to the relief item in the county budget. The determination of eligibility for care by the county physician is a responsibility of the local health center, and the accounts are checked by the local welfare agency. There is no professional or administrative connection between the county physicians and the county health centers or the county hospitals.

Home nursing service.—This element of the service is to provide nursing care in the home for patients who are not hospitalized and who are not able to go to a treatment center. The following agencies carry on this service to a limited extent: Oakland Visiting Nurse Association, Baby Hospital Association, Berkeley Health Center,

Alameda Health Center, and to a lesser extent the outlying centers of the county. It was not possible to separate the visiting nurse calls from those of a preventive character, and it was not possible to allocate the cost according to type of service and source of funds.

EXPENDITURES

COUNTY INSTITUTIONS, RECEIVING HOSPITALS, AND COUNTY PHYSICIANS

Name	County	Other	Total	Per cent	Per capita
Arroyo Sanatorium	$162,687		$162,687	13.51	$0.369
Fairmont Hospital	399,165		399,165	33.15	.907
Highland Hospital	592,325		592,325	49.19	1.34
Receiving Hospital	35,852		35,852	2.98	.081
County physicians	14,202		14,202	1.18	.032
Subtotal	1,204,231		1,204,231		2.711
Del Valle Farm		$10,333	40,333		.092
Grand total	1,204,231	40,333	1,244,564		2.80

EXPENDITURES FOR PREVENTION

Area	County	City	Other local	Collections	Schools	Del Valle	Total	Per capita
Oakland	$24, 201. 84	$170, 430. 08	$35, 869. 46	$3, 703. 90	$41, 346. 56	$24, 761. 10	$300, 312. 94	$1. 07
Berkeley	5, 047. 15	33, 675. 53	3, 221. 17	2, 709. 77	18, 622. 00	7, 066. 70	70, 342. 32	. 97
Alameda city	2, 612. 80	22, 588. 52	----------	----------	7, 087. 11	2, 483. 00	34, 671. 43	1. 02
Remainder of county	30, 772. 00	10, 694. 00	5, 197. 12	----------	11, 065. 00	3, 762. 50	61, 490. 62	. 78
Total	[1] 62, 533. 79	237, 388. 13	44, 287. 75	6, 413. 67	78, 120. 67	38, 073. 30	466, 817. 31	1. 0[illegible]
Percentage	13. 40	50. 85	9. 49	1. 37	16. 73	8. 16	----------	----------

[1] Exclusive of rodent control.

EXPENDITURES FOR TREATMENT

Purpose	County	City	Other local	Collections	Total	Per cent	Per capita
County hospitals	$1, 154, 177. 00	----------	----------	----------	$1, 154, 177. 00	82. 54	$2. 621
Emergency	35, 852. 00	$5, 700. 00	----------	----------	41, 522. 00	2. 97	. 09
County physicians	14, 202. 00	----------	----------	----------	14, 202. 00	1. 01	. 032
Oakland Health Center	74, 417. 84	----------	----------	$10, 975. 07	85, 392. 91	6. 11	. 194
Out-patient department, Baby Hospital	16, 601. 89	----------	$9, 503. 96	4, 826. 32	30, 932. 17	2. 21	. 070
Berkeley Health Center	17, 454. 66	15. 998. 81	11, 139. 83	9, 371. 23	53, 964. 53	3. 86	. 123
Alameda Health Center	12, 462. 20	5, 646. 48	(1)	(1)	18, 108. 68	1. 29	. 041
Total	1, 325, 167. 59	27, 345. 29	20, 643. 79	25, 172. 62	1, 398, 329. 29	99. 99	3. 175
Percentage	94. 77	1. 95	1. 48	1. 80	----------	----------	----------

[1] Amount included in other funds.

COMMENTS

In general, the plan of organization of the county institutions seems to be correct and workable, and the institutions appear to be well managed. So far as could be ascertained, they are adequate to meet the present needs of the county with the exception of certain minor ones, and these are mentioned in the body of the report. It may be said of the institutions that in their development and management they are far in advance of other related elements in the whole program of prevention and treatment.

The present emergency service is not satisfactory in that it is not uniform throughout the county in regard to its provisions, management, or method of financing. The present County Receiving Hospital is not suited to the purpose of a general emergency hospital and there is serious question concerning its necessity in view of the facilities available at Highland.

The provision for the care of ambulatory patients, while being fairly adequate in the three largest cities, is not so in the other sections of the county. The chief defect, however, lies in the plan of organization and administration. The health centers are performing a county service which should bear a direct relationship to other elements in the treatment program. Under the existing plan of administration, they are not directly under county control and the work which they perform is not integrated with other branches of the treatment service.

Sufficient information could not be ascertained concerning the quantity or quality of service delivered by the county physicians. Irrespective of the quantity or quality of the service, the plan of administration is wrong in that at present the county physicians are directly accountable to the county supervisors and are paid by the welfare organizations. County physicians should fill a definite place in the program, but this can not be done until the service is coordinated with the other parts of the program and placed under the same unified direction. The provisions for home nursing care of the sick are entirely inadequate, and as at present administered this element of the service can not be expected to fill the rôle it is intended to occupy in the whole scheme of treatment.

MAJOR RECOMMENDATIONS

All of the foregoing services, while differing in the approach to their problems, have as a common purpose the maintenance of health. The public-health agencies seek to prevent disease by the application of measures directed to that end. The curative agencies seek to restore to health those who have become afflicted with disease or disability. Neither agency is or possibly ever will be complete in

itself. A separation of their functions into distinct fields is no longer possible. With advancing knowledge, most diseases and disabilities become more and more preventable. The prompt and proper treatment of communicable diseases is a most effective measure of controlling spread. In some instances the prevention of a graver malady lies in correction of the condition during the stage of its incipiency. On the other hand, both prevention and cure of many conditions become a question of right living and general education directed to these ends.

Heretofore, each agency has felt that it would lose by being placed under the other and that to reach its full development it must be a primary unit of government directly responsible to the principal executive in the local government. This attitude has been more pronounced on the part of the health agencies engaged in prevention. It is based upon many years of experience, during which they have led a lean existence when united with agencies engaged in treatment. The reason for this is obvious. Public sympathy always goes out to the ill; and the average mind thinks in terms of sick individuals rather than in terms of death rates or sickness rates. To put it in other words, an infant mortality problem makes little impression, while sick children always bring forth a response in the form of private contributions or public appropriations.

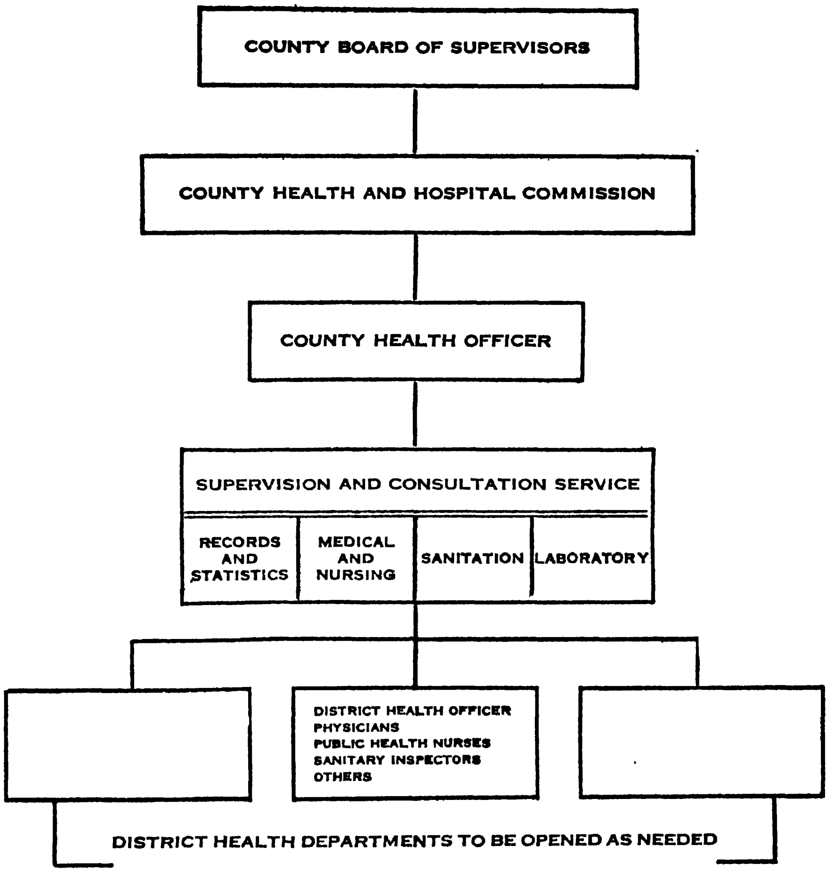
It is believed by the surveyor, as well as by local persons who have given thought to the subject, that the time has arrived in Alameda County for the development of a coordinated program of administration for both treatment and prevention under the county government. A certain amount of unification in the control of these functions will be necessary in order to obtain this result, since something more than a plan of cooperation is indicated. In the plan suggested below, the proposed health and hospital commission is made the primary unit of government directly responsible to the executives of the county. Prevention and treatment are under separate directors with equal rank. Under such an arrangement, treatment and prevention should be coordinated, have independence of action, and, at the same time, each should develop its full potentialities. Recommendations to this end, as well as for the strengthening of certain major elements of the program, are therefore submitted.

GENERAL ADMINISTRATION

1. That the name of the county institutions commission be changed to "county health and hospital commission," or other descriptive title; and that the membership of the present county institutions commission be surveyed, and, if necessary, changed so as to insure proper representation of public health and educational interests and of the units of population to be served by the proposed county health department.

2. That the function of the county health and hospital commission include administration of all county activities related to (1) prevention of disease and promotion of health, and (2) care of the sick.

COUNTY HEALTH DEPARTMENT



SERVICES

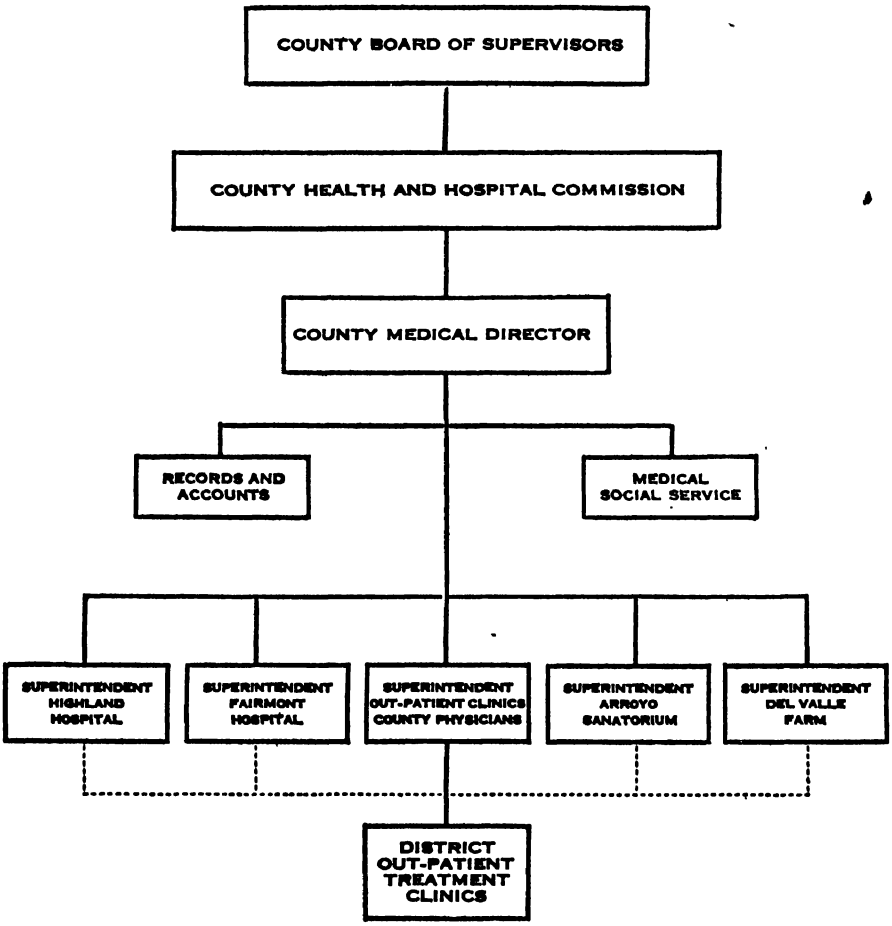
1. ENVIROMENTAL SANITATION
2. FOOD SANITATION
3. FIELD CONTROL—COMMUNICABLE DISEASES
4. FIELD CONTROL—TUBERCULOSIS
5. FIELD CONTROL—VENEREAL DISEASES
6. MATERNITY HYGIENE
7. INFANT AND PRE-SCHOOL HYGIENE
8. HYGIENE OF SCHOOL CHILD
9. MENTAL HYGIENE
10. INDUSTRIAL AND ADULT HYGIENE
11. FIELD NURSING SERVICE
12. POPULAR HEALTH INSTRUCTION
13. VITAL STATISTICS
14. OTHER NECESSARY PUBLIC HEALTH ACTIVITIES

CHART 1.—Proposed plan of county health department

3. That the medical director of the county institutions commission as now organized be placed in administrative charge of all treatment services receiving county funds and be accountable for such services to the county board of supervisors through the county health and hospital commission.

4. That under the proposed county health and hospital commission there be created one additional director co-equal with the present medical director of county institutions who will have charge of prevention of disease and the promotion of health throughout the areas of the county served by the proposed county health department.

COUNTY HOSPITAL AND OUT-PATIENT SERVICE



SOLID LINES INDICATE ADMINISTRATIVE CONTROL—DOTTED LINES CORRELATION OF AGENCIES AND SERVICE.

CHART 2.—Plan of organization of county hospital and out-patient service

The said director of the proposed county health department is to be the duly appointed county health officer.

PREVENTION OF DISEASE AND PROMOTION OF HEALTH

1. That the program of disease prevention and health promotion be unified throughout the county by the creation of a county health department to be under the direction of a trained medical health

officer of demonstrated administrative ability, who will serve on a full-time basis.

2. That the director of the proposed county health department be the county health officer, and that he have administrative control of all public-health services, preventive clinics, and field activities in the areas served by the county health department.

3. That the county health officer be nominated by the proposed county health and hospital commission, and that he be appointed by and be accountable to the county board of supervisors through the county health and hospital commission.

4. That a county health department be created at once for the unincorporated areas; and that as cities make application, their public-health work be assumed by the county health department.

5. That the expenditures for such service begin at $1 per capita in the areas served, and that such funds be derived from county taxes.

6. That the control of public-health service by the proposed county health department within the cities be acquired by contract. That there be no charge to the city for such service unless the city demands a type of service above or beyond that furnished to other portions of the county, in which case the city would be required to supplement the budget to the extent of the cost of the additional service.

7. That after organizing the county health department and after allowing a reasonable time for adjustment of program and finances, the county discontinue financial aid to preventive work (maternity and child welfare, child guidance, immunization and similar clinics) in the health centers, unless, or until the general public health work of the area served by the health center be under the county health department.

8. That in areas served by the county health department the schools should not maintain a separate health organization beyond that essential for purely educational functions. For other services, the schools should contract with the county health department.

TREATMENT OF THE SICK

COUNTY INSTITUTIONS

That Del Valle Farm in its entirety be transferred to the county and that funds for its maintenance and operation be derived from taxation. The management should remain as it is, under the county institutions commission (or new county health and hospital commission).

EMERGENCY SERVICE

1. That emergency service as a county function be discontinued or else be developed in accordance with a policy which will provide a uniform county-wide service. The latter course is preferred.

2. That any emergency service retained or developed by the county be placed under the financial and administrative control of the county institutions commission. The cost of such service should be charged to the budget of the county institutions commission.

CARE OF THE AMBULATORY SICK

(Health Centers)

1. That the treatment function of all health centers be assumed by the county institutions commission. This should involve control over appointments, budgets, and accounts, and, where desirable, ownership of property.

2. That the cost of treatment in health centers, including personnel and operation, be carried on the budget of the county institutions commission.

3. That the county institutions commission survey existing treatment health centers from the point of view of physical condition, location, and place in the unified program. The commission should then project a plan which will meet the requirements in the most effective and economical manner, giving attention to the needs of the outlying portions of the county and a unification of the facilities in Oakland.

4. That two positions be created, viz, director of out-patient treatment service, and director of medical social service, both to be under the medical director of county institutions. The director of out-patient service would have charge over all out-patient treatment and the director of medical social service would have charge of all medical social service, both for the institutions and the out-patient clinics.

5. That the medical director of county institutions be placed in administrative charge of all treatment clinics receiving county funds and be accountable for such services to the county board of supervisors through the county institutions commission.

6. That in areas served by the proposed county health department the preventive functions of the health centers be under the direction of the county health officer. However, to prevent waste of funds and duplication of effort, joint use of facilities should be required and accounts should be adjusted by transfer of funds or exchange of services.

HOME CARE OF THE SICK

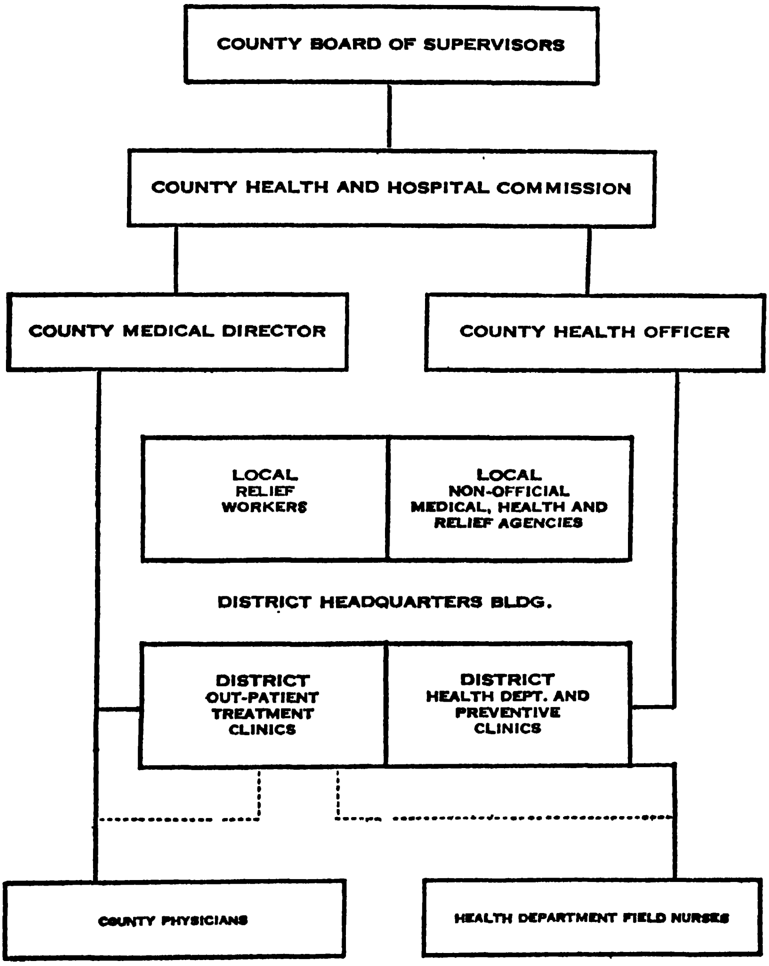
County physicians.—1. That the employment of county physicians and the administration of their work be placed under the direction of the county institutions commission.

2. That calls for such service be placed through the health centers when open, and through Highland Hospital at other times.

3. That the county institutions commission ascertain the need for county physicians and fix the number of physicians and rate of compensation accordingly.

4. That all bills be handled in the manner prescribed for county institutions and that the cost of county physicians be charged to the budget of the county institutions.

COUNTY FIELD PLAN OF PREVENTION AND TREATMENT



SOLID LINES INDICATE ADMINISTRATIVE CONTROL—DOTTED LINES CORRELATION OF AGENCIES AND SERVICES.

CHART 3.—Organization chart of county field plan of prevention and treatment

Home nursing service.—That field nursing service in areas served by the proposed county health department be organized on a generalized district basis under the control of the director of the proposed county health department and that the number of nurses be sufficient to meet the field needs of both the preventive and the treatment service.

WELFARE

That welfare work pertaining to the giving of material relief, development of character, and similar activities not primarily concerned with the prevention or cure of illness be developed as a function of the county, separate from the prevention or treatment of illness. In so far as may prove practicable, there should be joint use of facilities and personnel in order to promote efficiency and economy in administration.

FURTHER BIOCHEMICAL STUDIES ON THE ANTINEURITIC VITAMIN

By ATHERTON SEIDELL, *Chemist*, and MAURICE I. SMITH, *Senior Pharmacologist, National Institute of Health (formerly Hygienic Laboratory), United States Public Health Service*

Progress in the biochemical study of the antineuritic vitamin depends upon improvements both in the chemical processes of fractionation and in the physiological methods of testing the products obtained.

An accurate comparison of the advances claimed by various investigators is difficult to make, on account of the variety and imperfections of the physiological methods of control which have been employed. It is, consequently, highly desirable that greater attention be directed toward correlating the two branches of the problem and securing results which permit a more accurate comparison between purity of product and degree of antineuritic activity.

The present experiments are concerned with both phases of the subject. An improved physiological method described in a previous paper (1) has been used to control chemical fractionation steps, applied to a vitamin salt mixture prepared from brewer's yeast by a process involving adsorption on fuller's earth and subsequent purification by benzoylation (2).

The most highly purified fraction which has been obtained is active when tested on rats by the method referred to (1), in 0.05 mg. doses containing 0.0062 mg. nitrogen (12.4 per cent N). It is active in preventing loss of weight in pigeons fed exclusively on polished rice, in alternate day doses of 0.2 mg. containing 0.025 mg. nitrogen.

Through the kindness of Mr. R. R. Williams, who obtained personally from Dr. B. C. P. Jansen a small sample of the vitamin crystals made by the Jansen and Donath method (3), a direct comparison of the activity of these crystals and of our most highly purified fraction has been made. The smallest curative dose of the crystals for polyneuritis in rats was found to be 0.04 mg. containing 0.0069 mg. nitrogen (17.23 per cent N). Therefore, on the nitrogen basis the

two samples are of almost identical activity. Our concentrate has, so far, resisted all efforts to make it crystallize. The explanation of this may be that there is still present some non-nitrogenous impurity which prevents the crystallization of the active material in the sample.

Sufficient evidence has not as yet been obtained to indicate whether we are dealing with exactly the same compound as that obtained in a crystalline state by Jansen and Donath. Our product certainly does not respond to the Pauly reaction, as is claimed by Jansen and Donath for their crystals. Furthermore, Dr. M. X. Sullivan, of this laboratory, has obtained distinct evidence that a fairly large proportion (about 6 per cent) of organically bound sulphur is present in our active fraction. It is, of course, possible that this sulphur forms a part of the extraneous material, apparently still present in our product. It is equally probable, however, that the sulphur is present in the vitamin molecule. Jansen and Donath (3), it is true, do not indicate sulphur to be a constituent of their crystalline material, but their method of analysis does not definitely exclude such a possibility.

EXPERIMENTAL

In brief, the steps involved in preparing the vitamin containing salts are as follows: (1) Heating fresh brewer's bottom yeast with about an equal volume of water to 90° C.; (2) allowing the mixture to cool and removing coagulated protein and insoluble matter by means of a Sharples super centrifuge; (3) adding 30 grams of English fuller's earth to each liter of the nearly clear aqueous solution and, after stirring for one-half hour or longer, separating with the aid of the centrifuge and drying the vitamin-containing fuller's earth ("activated solid"); (4) extracting the "activated solid" by violent agitation for five minutes in 0.4 normal sodium hydroxide, using 1,000 c. c. per 100 grams of the solid, removing the solid quickly by means of the super centrifuge, and promptly acidifying the aqueous solution with sulphuric acid; (5) evaporating the faintly acid solution by vacuum distillation to about one-tenth its volume and removing the insoluble material; (6) adding about an equal volume of ethyl alcohol and removing the $Na_2SO_4 \cdot 10\,H_2O$ which crystallizes out on standing; (7) distilling the 50 per cent alcoholic solution to near dryness, mixing the concentrate with an aqueous sodium carbonate solution, and adding an excess of benzoyl chloride; (8) repeatedly extracting the acidified mixture with chloroform; (9) pouring the thoroughly extracted and filtered acid aqueous solution into ten volumes of acetone; (10) collecting and drying the precipitated salt mixture.

EXTRACTION OF VITAMIN SALT MIXTURE

The vitamin-containing salt thus prepared usually has a nitrogen content of about 1 per cent but there may be considerable variation from this figure. It protects pigeons from loss in weight on an exclusive diet of polished rice in alternate day doses containing from 0.15 to 0.30 mg. of nitrogen.

Since the principal inorganic constituent of the vitamin salt mixture is sodium chloride, and this compound has solubility characteristics resembling more or less closely those of the antineuritic vitamin, an extensive series of experiments was required to select a solvent suitably adapted for effecting the desired separation. Percolation with various solvents was resorted to in the beginning, but later it was found that simple digestion was sufficient. In no case, however, was it possible to remove more than 90 per cent of the nitrogenous constituents present in the vitamin salt mixture. Of the various solvents and combinations which were studied during many months, the most satisfactory was a mixture of three volumes of normal propyl alcohol and one volume of concentrated hydrochloric acid ($d=1.19$). This is used in about the proportion of 3 c. c. of the solvent per gram of vitamin salts and the mixture is constantly agitated for 18 hours. The solution separated by centrifugation from the insoluble salts contains about 60–80 per cent of the nitrogen originally present and a corresponding proportion of the physiologically active constituent. A second extraction of the salts yields an additional amount of vitamin. Upon evaporation or distillation of the extracts, a semi-solid residue is obtained. By digesting this in a small amount of methyl alcohol the active material dissolves completely and the insoluble residue consists for the most part of a white crystalline solid which possesses no activity. It should be remarked here that most of the experiments were made with vitamin salt mixtures prepared by extracting "activated solid" with 0.4 normal sodium hydroxide solution (step 4 in the outline given above). In several cases, however, saturated barium hydroxide was substituted for the aqueous sodium hydroxide, and it was found that the resulting vitamin salt mixture contained a much larger proportion of inactive nitrogenous constituents. These interfered seriously with the subsequent steps and prevented the obtaining of fractions of as high activity as those about to be described.

ACETONE PRECIPITATION

The methyl alcohol solution obtained as described above when poured slowly into ten or more volumes of actively stirred acetone yields an insoluble more or less voluminous white precipitate. This is thrown down by centrifugation and when dried in a vacuum

consists of a white powder usually containing about 7 to 11 per cent of nitrogen (samples Nos. 28.163, 28.188A, 28.190A, 28.193A, 28.194A). Reprecipitation may sometimes be necessary to obtain a granular solid. This material is usually active in pigeons in doses of about 1.0 milligram, and cures polyneuritis in rats in about 0.5 milligram doses.

PLATINUM PURIFICATION

Numerous experiments have shown that a platinum precipitate is best obtained by dissolving the above product in not more than 10 c. c. of methyl alcohol per gram of sample and adding a 10 per cent solution of platinic chloride in methyl or ethyl alcohol. Unfortunately the end point of the precipitation can not be accurately judged. Even after allowing the solution to stand a day or more in the cold room, an additional clouding may be produced by a drop of the platinum solution. It will be noted, however, that the precipitate now redissolves on stirring and a further amount of permanent precipitate is not obtained under these conditions.

The platinum precipitate obtained in this way is separated by centrifugation and washed with methyl alcohol. It is then suspended in methyl alcohol to which a few drops of hydrochloric acid are added, hydrogen sulphide is passed through the solution for several hours, and the mixture is allowed to stand over night. The methyl alcohol solution, after separation from the black platinum sulphide, yields upon evaporation a residue which is extremely soluble in methyl alcohol, but very little so in ethyl alcohol, and evidently not at all in acetone or in ethyl ether. Many samples of this residue have been, with every possible care, subjected to the process employed by Jansen and Donath to secure crystals from the residue obtained by them from their platinum precipitate, but in no case have crystals been obtained. A slight increase in activity of the residue from the platinum precipitate, accompanied, however, by considerable losses of active material, has been effected as follows:

The residue obtained as above described is dissolved in a few cubic centimeters of methyl alcohol and absolute ether is added very gradually just to the production of a faint precipitate. The mixture is then placed in a desiccator containing calcium chloride as the drying agent, and a beaker of ether to provide for a gradual increase of concentration of ether in the methyl alcohol solution of the active compound. A deposit is gradually formed and the supernatant layer no longer gives a precipitate upon addition of ether. After decantation of the clear solution the deposit is redissolved in methyl alcohol containing a little ether, and this solution is likewise subjected to an atmosphere of ether in a desiccator containing calcium chloride. The deposit now obtained (samples Nos. 28.159, 28.183, 29E, 29.G2, 29.N,

29.Q, 29.48), when examined under the microscope, consists of transparent irregularly shaped particles. The refractive index of one sample, kindly measured by Doctor Wherry, of the Bureau of Chemistry, was approximately 1.56; but the material failed to polarize light and apparently possessed no inherent crystalline character. It did not respond to the Pauly test. Two samples contained, respectively, 9.1 and 3.3 per cent chlorine. The best samples were effective in curing polyneuritis in rats in doses of 0.05 mg. and protected rice-fed pigeons against loss of weight in doses of about 0.2 mg. Determinations of nitrogen in the highly active samples gave results varying between 10 and 13 per cent.

SOME BIOLOGICAL CHARACTERISTICS OF THE VITAMIN CONCENTRATE OBTAINED FROM THE PLATINUM PRECIPITATE

The experiments on this phase of the problem concern the antineuritic potency of several of the concentrates prepared by the method described above, and the relation thereof to the thermostable growth-promoting vitamin (variously referred to as B_2 and G). The activity of several of the concentrates measured in terms of the minimum amount required to effect a cure of polyneuritis in rats on a diet adequate in all respects with the exception of the antineuritic vitamin (1) is shown in the accompanying table. It will be seen that the activity of the several concentrates varied from 0.05 to 0.30 mg.

TABLE 1.—*Activity of several concentrates*

Concentrate No.	Dose administered	Number of rats	*Result* R=Complete recovery within 36 hours or less, lasting 3 days or longer. P=No improvement noticeable within 48 hours.
	mg.		
28-159 (10 per cent N)	0.06	5	P P P P P
	.08	4	R R R R
	.10	6	R R R R R P
29-G2 (12.4 per cent N)	.05	4	R R R P
29-N (13 per cent N)	.04	3	P P P
	.05	3	R R R
	.06	4	R R R P
29Q2	.10	7	P P P P P P R
	.15	2	P P
	.20	2	P P
	.30	2	R R
29-48	.06	6	R R P P P P
	.07	6	R R R R R R
Jansen-Donath crystals	.03	2	P P
	.04	3	R R R
	.05	3	R R R

In order to ascertain the rôle of this antineuritic concentrate in the nutrition of the rat, experiments were made to determine its behavior when used as a daily supplement to (*a*) a diet deficient in both the antineuritic and thermostable vitamins, and (*b*) a diet deficient in the antineuritic vitamin alone. In all cases the preliminary treatment was the same as described in the previous publication

(1). Rats were placed on a diet in which the antineuritic vitamin was, as far as is known, the sole limiting factor until polyneuritis developed. The ration was then changed to one deficient in both vitamins, by replacing the autoclaved yeast with an equivalent amount of starch. The antineuritic concentrate was then administered intravenously in daily doses of 0.1 mg., or approximately 20 per cent in excess of the minimal curative dose. The animals recovered from the paralysis promptly but failed to grow. Death, apparently due to nutritive failure, followed in from 22 to 32 days, with no skin lesions. This type of experiment is illustrated in curve 329, Chart 1. By increasing the daily intravenous dose of the antineuritic concentrate 5 to 10 fold, i. e., to from 0.5 to 1.0 mg., the weight curve showed the same features, but the life of the animals was sufficiently prolonged to permit the development of skin lesions, e. g., fissures at the corners of the mouth, with a tendency to bleeding and some desquamation of the skin over the nose and the inner surfaces of the front feet. The weight curve of one of these animals is illustrated in curve 374 of the chart.

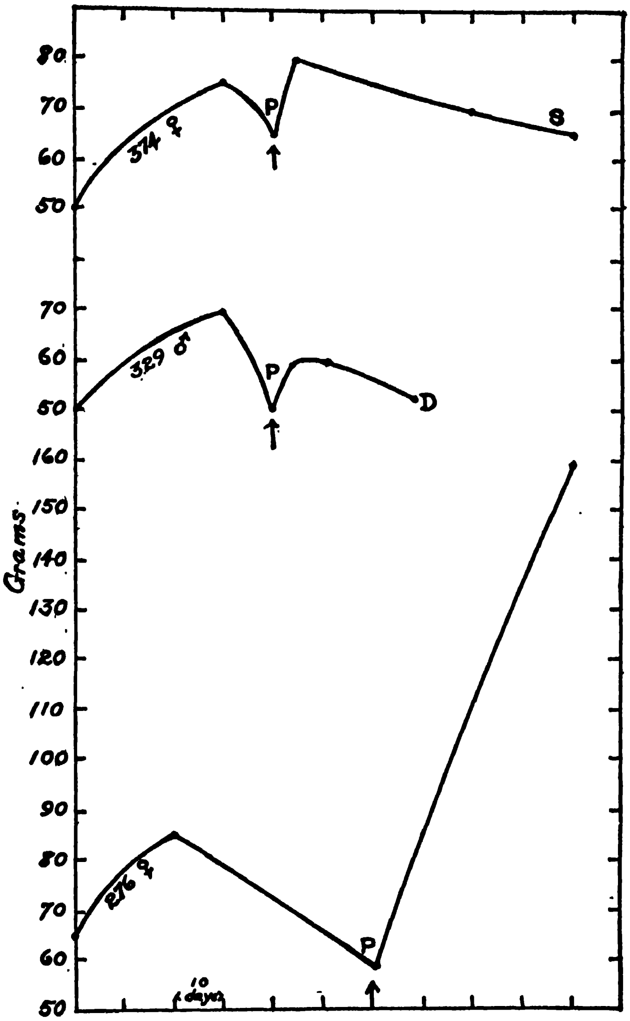


CHART 1.—Shows effect of the antineuritic fraction obtained by platinum precipitations when used by itself or in conjunction with the thermostable growth factor. First period, to arrow, polyneuritis producing diet (1) followed by polyneuritis at P. At this point rat 276 was continued on the same diet and in addition received daily intravenous injections of 0.1 mg. fraction 28.159. Rats 329 and 374 were changed at P to a diet deficient in the B complex (10 per cent of autoclaved yeast were replaced with an equivalent amount of starch) and in addition received daily intravenous injections of 0.1 and 1.0 mg. respectively of similar antineuritic fractions, 29-G2 and 29-48. All the rats promptly recovered from the paralysis. Rat 329 died in 28 days with no signs of paralysis or skin lesions, while rat 374 survived 60 days, at which time the experiment was discontinued. Skin lesions developed in rat 374 at S after 55 days. Rat 276 grew at a normal rate

If, however, the daily intravenous injection of 0.1 mg. of the antineuritic concentrate was given to rats having developed polyneuritis on our special polyneuritis-producing diet, and the administration of the thermostable growth factor was continued, normal growth ensued, as shown in curve 276 of the chart. It may be concluded, therefore, that the present concentrate is a highly active antineuritic fraction, probably wholly free from the thermostable component of the vitamin B complex, and when supplied in sufficient amount in conjunction with a diet adequate in all other respects satisfactorily meets the nutritional requirements of the rat in so far as normal growth is concerned.

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(1) M. I. Smith: Pub. Health Rep., **45** (1930), 116–129.
(2) A. Seidell: Jour. Biol. Chem., **82** (1929), 633–640.
(3) Jansen and Donath: Med. van den Dienst der Volksgesondheid in Ned. Indie, part 1 (1927). Weltevreden, Batavia, Java.

COMPARATIVE CURRENT STATE MORTALITY STATISTICS [1]

In this, as in the preceding report on current mortality statistics, the plan of publication has been changed from a monthly basis to the presentation of rates for a period including as many months of the current calendar year as are available, with comparative rates for the same period in the three preceding calendar years where data are available for those years. In the present report, figures are given for the 8-month period from January to October of 1930 for a number of the States, but for others the period is shorter. In the instance of many of the causes of death included in this report there is little seasonal variation and monthly rates seem unnecessary. It is believed that these rates for the "year-to-date" for each State with comparative rates for corresponding periods in preceding years will be more useful than monthly rates.

The rates are computed from current and generally preliminary reports furnished by State departments of health. Because of (*a*) some lack of uniformity in the method of classifying deaths according to cause, (*b*) some delayed death certificates, and (*c*) various other reasons, these preliminary rates can not be expected to agree in all instances with final rates published by the Bureau of the Census, which are based on a complete review and retabulation of the individual death certificates from each State. The preliminary rates given in the accompanying table are intended to serve as a current index of mortality until final figures are issued by the Bureau of the Census.

Populations used in computing rates are as of July 1 of each year, based on the 1920 Census and provisional results of the 1930 Census. Rates for 1930 and comparative years have been recomputed on new population estimates.

[1] From the Office of Statistical Investigations, United States Public Health Service.

Death rates from certain causes in stated periods of 1930, with comparative data for corresponding periods in preceding years

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births			Rates per 100,000 population (annual basis)																				
				Infant mortality	All except malformations and early infancy	Maternal mortality (143-150)	Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31-37)	Cancer, all forms (43-49)	Diabetes (57)	Diseases of the nervous system (70-86)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87-96)	Diseases of the heart (87-90)	Diseases of the respiratory system (97-107)	Pneumonia, all forms (100, 101)	Diseases of the digestive system (108-127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
Alabama	January to September	1930	11.3	74	45	7.8	7.4	3.4	0.8	10.4	3.4	34.4	0.8	0.7	1.5	82.3	50.8	8.1	93.9	60.1	144.0	127.1	97.6	86.8	88.2	30.5	98.3
		1929	12.4	78	47	8.9	7.5	2.8	1.0	10.3	5.7	143.9	1.0	1.1	1.0	82.9	46.6	8.5	96.8	58.3	136.8	127.4	98.7	91.4	101.3	28.5	89.8
		1928	12.0	81	50	8.5	8.9	10.2	.2	7.6	5.0	60.6	.8	[1]	[1]	89.3	47.6	9.7	[1]	57.1	[1]	127.4	[1]	103.9	[1]	37.1	87.7
		1927	10.1	63	34	7.4	11.9	4.6	.7	15.3	5.7	26.6	.7	[1]	[1]	86.7	47.2	7.6	[1]	47.0	[1]	97.9	[1]	60.4	[1]	29.8	73.4
Arizona	January to July	1930	16.2	134	93	5.1	9.6	2.5	2.0	11.8	8.0	20.0	2.0	.4	24.4	338.1	55.1	6.0	108.2	54.7	168.9	137.4	230.4	186.5	166.1	84.2	56.3
		1929	16.9	139	107	5.6	16.9	[2]	3.6	12.1	2.4	26.5	.8	.8	18.5	417.2	57.5	4.4	98.5	45.8	140.3	127.4	181.3	144.8	188.9	128.2	66.7
California	January to August	1930	11.6	58	29	5.6	1.8	7.3	1.4	4.4	3.4	8.7	2.1	1.1	3.3	103.3	124.4	18.7	111.6	81.4	276.8	235.9	83.6	71.0	79.4	15.7	84.5
		1929	12.1	66	35	5.5	1.7	.4	2.0	6.3	2.8	23.9	.8	1.4	8.2	112.4	117.4	19.0	115.0	81.5	289.6	255.0	94.0	81.4	79.7	14.0	91.5
		1928	11.9	61	33	5.6	2.0	.7	.8	6.1	5.8	14.7	1.6	1.0	2.0	117.5	117.1	18.4	118.3	83.2	263.8	226.7	87.6	76.2	83.1	15.4	95.5
Connecticut	January to September	1930	10.8	59	[1]	[1]	.7	.1	2.0	1.9	2.4	15.8	1.4	1.0	1.2	61.8	115.7	17.9	[1]	[1]	[1]	186.0	[1]	94.3	[1]	9.2	71.7
		1929	11.5	69	[1]	[1]	.8	4.0	1.2	2.9	3.5	47.1	.3	1.4	1.0	66.3	114.4	17.2	[1]	[1]	[1]	195.7	[1]	113.7	[1]	14.1	71.6
		1928	11.4	64	[1]	[1]	.9	4.8	1.8	7.3	5.2	23.7	.8	1.4	1.0	71.4	107.4	[1]	[1]	[1]	[1]	175.7	[1]	111.4	[1]	7.2	[1]
		1927	10.7	61	[1]	[1]	1.0	1.8	1.3	2.5	5.3	20.9	.8	[2]	.8	69.8	104.7	[1]	[1]	[1]	[1]	182.3	[1]	86.4	[1]	9.9	[1]
District of Columbia.	January to October	1930	15.1	70	36	9.6	3.4	.2	2.2	4.9	3.0	6.6	.5	.5	1.5	119.8	137.8	27.8	139.2	99.1	371.2	315.4	136.5	115.9	106.8	20.4	159.2
		1929	15.4	71	36	5.9	2.7	[2]	2.5	5.2	6.7	23.8	1.0	1.0	2.2	119.9	129.6	27.3	134.1	81.7	372.7	321.1	164.9	142.5	103.8	20.6	163.4
		1928	15.0	[1]	[1]	[1]	3.0	4.3	1.8	3.5	8.8	14.8	1.3	1.3	.8	124.1	124.6	28.3	147.0	104.3	345.3	306.0	157.8	132.2	100.3	15.8	154.7
		1927	14.8	[1]	[1]	[1]	2.0	[2]	.8	3.5	5.1	21.8	1.5	1.8	.8	131.3	127.0	22.8	147.0	103.4	325.2	285.4	143.5	120.9	90.5	12.9	181.0
Florida	January to September	1930	12.2	65	32	9.7	5.3	5.5	.3	4.0	3.3	23.5	1.1	.5	.5	68.5	69.6	14.6	128.3	104.8	199.5	174.6	76.7	58.3	92.0	17.4	121.0
Georgia	January to August	1930	12.0	83	[1]	10.8	13.5	6.3	1.0	10.1	2.9	38.7	1.0	.3	3.5	76.4	49.6	11.6	128.5	[1]	154.3	139.4	106.8	91.5	88.1	25.8	133.2
		1929	11.8	[1]	[1]	[1]	10.0	1.5	.9	9.1	3.6	116.3	[1]	[1]	[1]	76.3	46.5	9.7	[1]	[1]	[1]	121.9	[1]	81.0	[1]	20.0	131.4

[1] Not available.
[2] No deaths.

Death rates from certain causes in stated periods of 1930, with comparative data for corresponding periods in preceding years—Continued

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births: Infant mortality	Rate per 1,000 live births: All except malformations and early infancy	Rate per 1,000 live births: Maternal mortality (143–150)	Rates per 100,000 population (annual basis): Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31–37)	Cancer, all forms (43–49)	Diabetes (57)	Diseases of the nervous system (70–86)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87–96)	Diseases of the heart (87–90)	Diseases of the respiratory system (97–107)	Pneumonia, all forms (100, 101)	Diseases of the digestive system (108–127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
Hawaii	January to September	1930	10.4	81	(1)	(1)	2.9	5.4	.4	4.7	11.9	8.7	(2)	(2)	5.1	98.8	54.1	13.0	(1)	45.1	(1)	122.7	(1)	118.0	143.2	84.4	(1)
		1929	12.8	(1)	(1)	(1)	4.5	6.7	(2)	36.2	9.7	22.0	1.1	.7	26.9	108.7	64.2	12.7	(1)	54.9	(1)	119.9	(1)	156.1	179.6	112.4	(1)
		1928	11.8	(1)	(1)	(1)	7.7	2.3	1.5	2.7	13.8	21.8	(2)	(2)	4.2	125.9	62.4	6.5	(1)	57.0	(1)	113.7	(1)	156.5	146.6	83.4	(1)
Idaho	January to October	1930	9.5	46	20	4.3	3.5	1.3	1.3	4.3	3.2	10.8	.8	(1)	5.7	33.9	61.6	6.7	99.3	66.7	188.9	166.8	116.8	100.4	64.9	4.	636.1
Illinois	do	1930	(1)	(1)	(1)	(1)	1.9	1.2	4.0	2.1	6.7	11.2	.7	.4	2.6	60.8	(1)	(1)	(1)	(1)	(1)	(1)	(1)	61.5	(1)	(1)	(1)
		1929	(1)	(1)	(1)	(1)	1.5	4.1	3.8	3.5	9.1	38.5	.2	.7	3.3	71.3	(1)	(1)	(1)	(1)	(1)	(1)	(1)	81.9	(1)	(1)	(1)
		1928	(1)	(1)	(1)	(1)	2.2	1.1	1.9	3.9	7.6	(1)	(1)	(1)	2.8	74.4	(1)	(1)	(1)	(1)	(1)	(1)	(1)	94.9	(1)	(1)	(1)
		1927	(1)	(1)	(1)	(1)	2.4	4.0	2.3	4.2	8.9	(1)	(1)	(1)	1.8	76.3	(1)	(1)	(1)	(1)	(1)	(1)	(1)	74.9	(1)	(1)	(1)
Indiana	January to October	1930	(1)	(1)	(1)	(1)	4.1	1.8	2.0	3.3	3.7	19.2	.8	1.3	8.8	64.9	101.1	15.3	(1)	108.3	(1)	182.6	(1)	80.4	(1)	20.5	85.1
		1929	12.3	67	(1)	7.0	3.3	4.5	3.3	5.8	4.2	65.1	.2	.5	1.2	70.9	99.0	14.7	(1)	107.4	(1)	201.7	(1)	97.5	(1)	19.0	80.2
		1928	11.8	64	(1)	6.1	4.2	2.2	2.1	4.5	4.8	41.8	(1)	(1)	(1)	70.0	100.0	(1)	(1)	108.3	(1)	179.9	(1)	93.0	(1)	19.5	80.7
		1927	11.5	60	(1)	6.8	4.7	2.0	2.5	6.0	6.1	25.7	(1)	(1)	(1)	71.6	102.2	(1)	(1)	101.0	(1)	169.2	(1)	74.4	(1)	18.5	81.3
Iowa	January to September	1930	10.7	55	21	7.7	1.4	10.4	3.1	4.1	1.7	26.6	1.5	2.5	3.4	34.2	111.0	21.3	135.1	95.1	243.9	191.4	87.4	79.2	74.2	6.1	41.6
		1929	10.5	54	21	5.9	1.6	1.2	2.2	4.9	1.1	62.5	.8	1.2	1.8	35.4	109.0	18.1	132.4	96.8	249.5	217.6	76.9	62.8	63.1	4.1	51.1
		1928	10.2	57	22	5.5	2.3	(2)	1.8	3.2	2.1	41.2	.7	1.4	1.1	36.2	111.4	18.3	134.4	98.2	233.9	207.7	75.6	65.4	68.2	6.0	52.7
Kansas	January to August	1930	10.6	54	24	7.7	2.2	6.1	2.6	4.3	3.0	34.7	1.8	.6	3.5	38.7	96.7	21.2	130.1	100.3	203.1	174.3	68.6	59.0	75.3	10.9	104.8
		1929	10.7	63	30	7.2	2.8	3.3	3.5	4.6	2.2	66.8	.5	.8	3.0	43.3	92.4	20.9	141.9	112.4	188.8	163.9	74.1	62.7	74.1	9.2	90.2
		1928	10.9	60	30	8.4	1.9	1.5	2.7	5.7	2.3	64.7	.4	1.0	1.0	42.2	95.1	20.5	141.1	107.8	201.4	174.0	74.3	60.7	81.8	15.3	90.5
Louisiana	January to September	1930	11.7	83	51	10.2	11.2	6.2	.4	6.2	3.9	37.3	2.1	.6	3.9	88.4	67.2	12.0	90.8	61.1	214.1	197.2	99.9	89.8	91.8	25.3	112.5
		1929	11.7	78	49	11.0	10.7	3.3	.5	6.2	4.3	91.7	.5	.3	2.3	87.9	64.0	11.0	87.9	56.8	200.0	185.0	89.6	79.6	93.0	27.4	106.7
		1928	12.1	81	50	11.2	12.7	11.2	.3	9.4	4.8	59.6	.9	.9	.7	93.8	63.4	11.6	95.2	64.1	189.2	177.9	105.7	94.0	96.8	27.7	109.9

Maryland	January to October	1930	13.2	72	38	5.5	6.5	.4	2.1	4.9	2.7	10.6	.4	1.3	1.4	103.8	112.6	21.2	140.9	104.3	277.4	242.2	128.0	114.0	92.3	32.6	150.2
Michigan	do	1930	10.7	64	28	6.1	1.8	5.6	2.9	4.0	6.6	12.4	.8	.9	8.7	61.1	91.0	17.7	118.1	89.3	228.9	202.6	85.0	69.9	83.6	15.1	63.4
		1929	12.0	68	33	6.2	1.8	3.2	3.2	6.0	10.3	42.5	1.0	1.2	19.6	68.7	92.8	19.9	133.2	93.6	245.9	214.4	107.4	91.6	89.0	17.4	66.7
Minnesota	January to September	1930	9.7	44	15	5.2	1.0	4.3	1.6	2.8	1.4	15.6	1.4	1.5	2.1	48.4	118.3	18.0	103.7	78.9	188.2	171.2	73.9	68.0	70.0	6.4	52.1
		1929	10.0	50	19	4.1	1.0	3.6	2.6	5.1	2.3	46.6	.4	2.4	2.0	58.0	112.1	18.7	101.6	75.2	199.1	154.3	75.4	68.1	67.1	4.1	55.0
		1928	9.9	(1)	(1)	(1)	.6	.4	2.6	2.6	2.5	34.8	2.2	2.5	1.6	58.8	114.4	19.6	(1)	(1)	(1)	151.7	(1)	66.6	(1)	(1)	57.4
Mississippi	January to August	1930	11.4	(1)	(1)	(1)	9.0	1.9	.4	8.9	3.4	33.9	.5	.2	9.2	85.1	47.0	8.9	(1)	70.2	(1)	106.9	(1)	68.3	(1)	13.9	101.9
		1929	12.1	(1)	(1)	(1)	9.3	6.0	(2)	11.2	2.7	146.4	.8	.5	.6	77.5	44.1	6.5	(1)	64.0	(1)	99.2	(1)	64.1	(1)	21.4	92.4
Montana	January to October	1930	9.7	(1)	(1)	(1)	2.9	2.7	2.9	3.4	.7	22.6	.7	1.6	4.9	63.2	76.4	17.5	97.9	66.3	154.1	140.2	92.7	80.2	92.5	14.1	73.5
Nebraska	January to August	1930	9.7	48	18	5.5	1.3	9.1	2.8	3.0	3.3	18.3	.9	.8	2.8	26.9	105.1	22.4	113.5	87.7	194.2	170.7	78.1	67.7	77.1	7.4	56.5
		1929	10.1	57	27	(1)	1.6	2.7	5.1	3.9	3.1	61.4	.4	.9	3.1	33.0	93.9	22.8	116.2	87.7	192.1	171.7	75.1	65.1	75.1	6.1	57.1
New Jersey	January to October	1930	10.6	(1)	(1)	(1)	1.1	3.6	1.4	2.3	8.5	8.5	.4	1.0	1.9	70.4	106.5	22.9	106.7	79.3	253.7	228.3	88.7	78.7	73.7	12.0	99.4
		1929	11.4	62	(1)	5.4	1.3	.9	1.1	5.2	10.3	27.5	.5	1.4	2.4	73.2	109.1	22.8	111.4	81.5	264.3	244.3	118.3	105.0	73.8	12.5	99.6
		1928	11.4	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	13.2	(1)	(1)	(1)	74.7	103.9	(1)	113.2	(1)	250.8	(1)	63.4	73.0	70.9	15.0	102.2
		1927	11.1	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	11.6	(1)	(1)	(1)	75.3	103.7	(1)	119.7	(1)	230.3	(1)	49.7	54.8	65.3	17.2	94.2
New York [3]	January to September	1930	12.6	60	24	5.7	1.3	1.8	1.4	4.2	2.7	10.7	1.9	.8	1.3	69.3	126.2	28.1	134.6	103.2	337.0	293.5	99.6	85.1	76.7	10.6	118.5
		1929	13.6	65	27	5.6	1.5	3.1	2.1	4.1	3.1	46.3	1.2	1.0	1.2	75.2	124.9	26.6	149.4	114.1	366.1	319.3	126.0	109.8	73.3	10.8	112.7
		1928	13.0	66	27	6.5	2.0	3.7	2.0	4.0	4.0	16.6	1.8	.8	.7	77.2	123.5	25.1	151.1	115.9	348.5	299.5	109.3	95.3	76.6	12.8	109.5
		1927	12.8	64	26	6.3	2.1	2.9	1.8	3.8	4.4	14.0	.9	.9	.2	79.3	123.9	24.3	148.2	111.3	328.8	283.2	102.0	85.3	79.0	14.0	113.8
North Carolina	January to May	1930	12.9	82	(1)	7.5	1.0	.1	1.2	10.6	5.6	45.0	.3	.7	1.1	90.5	(1)	(1)	(1)	(1)	(1)	(1)	(1)	140.2	(1)	17.1	(1)
		1929	13.4	(1)	(1)	(1)	2.4	1.1	2.1	7.9	7.4	170.2	.9	(2)	.5	91.8	(1)	(1)	(1)	(1)	(1)	(1)	(1)	134.9	(1)	14.8	(1)
		1928	11.8	(1)	(1)	(1)	1.9	34.6	1.8	7.9	7.0	55.0	.7	.9	(2)	86.3	(1)	(1)	(1)	(1)	(1)	(1)	(1)	140.7	(1)	13.6	(1)
Ohio	January to August	1930	11.7	57	24	5.8	2.3	4.0	2.3	3.5	2.7	21.4	.7	1.0	2.0	68.2	106.9	21.9	118.5	108.8	261.8	231.1	91.1	80.1	64.7	11.8	81.8
		1929	12.8	(1)	(1)	(1)	1.5	5.1	2.3	9.9	2.9	82.1	.6	(1)	3.1	73.3	103.8	(1)	(1)	101.8	(1)	217.7	(1)	99.1	(1)	10.5	84.8
		1928	12.2	(1)	(1)	(1)	1.5	4.1	2.3	3.3	5.5	41.0	1.0	(1)	2.0	76.5	105.2	(1)	(1)	102.9	(1)	(1)	(1)	95.3	(1)	9.8	68.4
Pennsylvania	January to September	1930	11.3	68	36	5.7	2.1	2.6	2.0	4.3	5.0	20.7	.5	1.0	2.3	61.4	95.4	21.4	112.0	82.7	258.1	229.2	108.6	95.0	81.3	21.2	101.7
		1929	12.4	72	39	6.3	2.0	4.6	2.7	6.4	6.7	67.7	.5	1.1	2.3	67.3	100.3	21.9	119.8	86.6	260.5	234.9	126.7	109.1	80.4	19.7	104.8
		1928	12.3	70	36	5.9	1.8	6.0	2.5	4.5	8.6	33.6	.8	1.2	1.0	72.6	99.4	22.3	(1)	90.2	(1)	230.4	(1)	114.7	(1)	22.6	111.0
		1927	11.8	69	35	6.4	2.6	2.9	2.8	5.5	7.9	26.9	(2)	1.0	.4	74.4	96.5	19.2	(1)	88.4	(1)	217.3	(1)	104.9	(1)	22.0	106.3
South Carolina	January to October	1930	(1)	(1)	(1)	(1)	18.0	.4	.5	12.0	5.3	50.3	1.0	2.7	4.0	76.8	38.9	8.2	(1)	(1)	309.0	(1)	(1)	94.8	(1)	(1)	119.9
		1929	(1)	(1)	(1)	(1)	14.4	.1	.9	12.7	8.6	80.4	.6	2.4	3.0	78.1	42.5	8.6	(1)	(1)	325.0	(1)	(1)	97.0	(1)	(1)	105.4
		1928	(1)	(1)	(1)	(1)	19.5	16.1	.5	10.0	10.1	70.6	1.0	2.4	1.6	85.4	44.6	9.0	(1)	(1)	312.3	(1)	(1)	113.2	(1)	(1)	113.1
		1927	(1)	(1)	(1)	(1)	23.7	3.8	.2	13.7	8.7	19.4	1.4	3.2	1.7	88.9	41.8	7.2	(1)	(1)	294.7	(1)	(1)	105.1	(1)	(1)	100.1

[2] No deaths.

[3] Exclusive of New York City.

Death rates from certain causes in stated periods of 1930, with comparative data for corresponding periods in preceding years—Continued

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births: Infant mortality	Rate per 1,000 live births: All except malformations and early infancy	Rate per 1,000 live births: Maternal mortality (143-150)	Rates per 100,000 population (annual basis): Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31-37)	Cancer, all forms (43-49)	Diabetes (57)	Diseases of the nervous system (70-86)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87-96)	Diseases of the heart (87-90)	Diseases of the respiratory system (97-107)	Pneumonia, all forms (100, 101)	Diseases of the digestive system (108-127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
South Dakota	January to May	1930	8.0	59	27	6.9	1.0	5.9	1.4	3.1	1.7	30.4	.3	.3	(2)	41.2	68.4	19.6	81.7	53.1	135.9	112.8	79.6	67.4	53.1	8.4	51.3
		1929	9.5	74	41	6.8	1.4	3.9	3.9	4.6	1.8	102.1	2.5	.7	3.2	54.9	61.9	20.4	90.4	55.6	156.6	139.7	104.5	89.7	66.5	4.9	46.0
		1928	9.0	68	33	4.9	1.8	1.8	3.5	4.6	3.2	53.3	(1)	(1)	(1)	74.2	66.1	19.1	98.2	55.8	140.3	120.8	99.6	84.4	65.0	8.5	41.7
Tennessee	January to October	1930	11.2	(1)	(1)	(1)	11.6	5.7	1.3	6.8	4.5	31.2	.9	.8	10.7	117.4	56.8	10.3	102.3	62.0	134.1	120.0	93.9	83.3	98.1	30.2	74.9
		1929	12.1	81	54	8.0	11.2	.6	2.0	7.6	6.1	117.7	1.3	.7	1.9	122.8	55.7	9.5	98.4	56.9	140.0	127.8	97.6	86.0	90.0	26.2	70.8
		1928	11.8	(1)	(1)	(1)	12.8	9.2	1.4	5.2	5.3	52.6	1.3	.7	.7	123.3	57.1	9.1	(1)	(1)	(1)	121.2	(1)	97.0	(1)	34.6	(1)
		1927	11.2	(1)	(1)	(1)	21.4	4.7	1.7	14.2	6.0	29.5	.9	.4	.5	128.6	(1)	(1)	(1)	(1)	(1)	(1)	(1)	76.4	(1)	29.3	(1)
Virginia	do	1930	11.7	72	(1)	6.5	5.8	4.4	1.1	11.8	4.6	28.5	.9	1.0	2.6	86.0	62.7	14.1	126.0	95.4	202.9	176.5	90.6	78.2	84.8	29.2	107.3
		1929	12.0	76	(1)	6.9	4.3	1.5	1.0	11.3	6.3	104.9	1.3	1.1	1.3	92.6	62.5	11.1	125.0	88.7	193.7	175.2	81.6	70.2	74.2	21.4	101.1
West Virginia	January to September	1930	10.1	(1)	(1)	6.0	10.2	5.8	1.9	13.4	4.4	26.9	.4	.5	1.4	65.8	58.0	11.9	88.4	59.4	143.9	113.6	88.8	80.7	119.2	64.7	52.2
		1929	10.9	(1)	(1)	5.8	9.9	5.6	1.2	13.7	3.4	114.5	1.0	.6	.9	68.8	58.7	9.0	86.2	48.4	153.5	110.8	96.1	80.5	112.6	63.0	53.8
Wisconsin	January to October	1930	10.3	56	(1)	4.8	.9	3.8	3.2	3.4	2.4	15.4	1.0	1.0	2.3	51.9	111.9	(1)	(1)	(1)	(1)	(1)	(1)	69.4	(1)	10.7	(1)
		1929	10.8	63	(1)	(1)	1.4	2.8	2.6	3.9	2.5	47.7	.5	1.7	4.1	54.3	110.1	(1)	(1)	(1)	(1)	(1)	(1)	73.0	(1)	11.9	(1)
		1928	(1)	60	(1)	(1)	.8	.4	2.3	2.3	3.2	30.6	.5	1.7	3.2	57.9	(1)	(1)	(1)	(1)	(1)	(1)	(1)	80.5	(1)	11.5	(1)

[1] Not available.

DEATHS DURING WEEK ENDED DECEMBER 6, 1930

Summary of information received by telegraph from industrial insurance companies for the week ended December 6, 1930, and corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

	Week ended Dec. 6, 1930	Corresponding week, 1929
Policies in force	75, 098, 994	75, 222, 398
Number of death claims	13, 993	13, 393
Death claims per 1,000 policies in force, annual rate	9. 7	9. 3

Deaths[1] from all causes in certain large cities of the United States during the week ended December 6, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Dec. 6, 1930				Corresponding week 1929		Death rate[2] for first 49 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1930	1929
Total (78 cities)	7,873	11. 9	715	[4] 57	12. 8	715	11. 9	12. 6
Akron	14	2. 9	8	28	9. 5	6	7. 8	9. 4
Albany[5]	34	13. 9	1	21	14. 0	3	14. 8	16. 3
Atlanta	70	13. 6	8	82	17. 7	13	15. 5	16. 0
White	31		5	79		6		
Colored	39	[6]	3	86	[6]	7	[6]	[6]
Baltimore[5]	243	15. 8	25	87	14. 1	21	14. 1	14. 6
White	183		15	67		13		
Colored	60	[6]	10	160	[6]	8	[6]	[6]
Birmingham	78	15. 7	12	115	14. 1	7	13. 7	15. 9
White	36		3	48		1		
Colored	42	[6]	9	220	[6]	6	[6]	[6]
Boston	176	11. 7	26	75	14. 2	24	14. 0	14. 9
Bridgeport	36	12. 7	5	86	11. 7	1	10. 9	12. 0
Buffalo	142	12. 9	22	98	13. 9	12	12. 9	14. 0
Cambridge	25	11. 5	1	20	10. 6	0	11. 8	12. 5
Camden	25	11. 1	0	0	13. 8	5	13. 6	14. 3
Canton	22	10. 8	1	27	12. 5	1	9. 8	11. 2
Chicago[5]	740	11. 4	67	59	11. 1	65	10. 4	11. 3
Cincinnati	139	16. 1	9	53	16. 7	8	15. 6	17. 0
Cleveland	183	10. 6	9	27	11. 9	17	11. 0	12. 3
Columbus	72	12. 9	6	59	16. 6	3	15. 4	14. 8
Dallas	54	10. 7	8		15. 2	8	11. 5	11. 5
White	40		6			7		
Colored	14	[6]	2		[6]	1	[6]	[6]
Dayton	51	13. 2	3	45	13. 2	3	10. 8	11. 5
Denver	69	12. 5	7	76	13. 5	11	14. 9	14. 8
Des Moines	28	10. 2	0	0	14. 4	4	11. 6	11. 6
Detroit	257	8. 5	37	57	10. 9	44	9. 3	11. 1
Duluth	28	14. 4	2	54	8. 8	0	11. 5	11. 4
El Paso	35	17. 8	4		10. 9	0	17. 0	19. 4
Erie	12	5. 4	2	44	9. 5	4	11. 1	12. 0
Fall River[5, 7]	22	10. 0	2	46	6. 4	1	11. 7	13. 4
Flint	23	7. 6	4	47	7. 5	4	9. 0	10. 7
Fort Worth	45	14. 5	3		13. 4	5	11. 0	12. 3
White	37		3			4		
Colored	8	[6]	0		[6]	1	[6]	[6]
Grand Rapids	34	10. 5	3	45	9. 1	3	10. 1	10. 2
Houston	76	13. 6	10		12. 4	10	12. 8	12. 6
White	50		5			9		
Colored	26	[6]	5		[6]	1	[6]	[6]
Indianapolis	107	15. 3	6	45	15. 5	11	14. 5	14. 8
White	88		6	52		10		
Colored	19	[6]	0	0	[6]	1	[6]	[6]

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1930 and 1929 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 73 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following percentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

Deaths from all causes in certain large cities of the United States during the week ended December 6, 1930, infant mortality, annual death rate, and comparison with corresponding week of 1929. (From the Weekly Health Index issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Dec. 6, 1930				Corresponding week 1929		Death rate for first 49 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1930	1929
Jersey City	67	11.1	9	78	12.6	5	11.4	12.4
Kansas City, Kans.	27	11.5	0	0	12.4	0	11.7	12.8
White	22		0	0		0		
Colored	5	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo.	97	12.8	4	33	15.7	5	13.4	14.0
Knoxville	16	7.8	2	47	11.1	0	13.5	13.9
White	9		2	52		0		
Colored	7	(6)	0	0	(6)	0	(6)	(6)
Los Angeles	273	11.4	24	73	7.7	14	11.1	11.3
Louisville	88	14.9	12	103	14.8	6	13.5	15.1
White	67		11	108		4		
Colored	21	(6)	1	66	(6)	2	(6)	(6)
Lowell [7]	20	10.4	3	79	13.9	4	13.3	14.0
Lynn	20	10.2	3	84	12.8	3	10.3	11.2
Memphis	74	15.3	6	71	21.2	9	16.9	19.0
White	37		1	18		6		
Colored	37	(6)	5	168	(6)	3	(6)	(6)
Milwaukee	136	12.4	13	57	11.1	11	9.8	10.9
Minneapolis	102	11.5	10	66	11.0	2	10.7	10.8
Nashville	43	15.2	3	47	19.2	6	17.3	18.6
White	19		3	63		5		
Colored	24	(6)	0	0	(6)	1	(6)	(6)
New Bedford [7]	26	12.0	3	77	7.8	2	11.0	12.0
New Haven	19	6.1	2	31	12.8	2	12.6	13.4
New Orleans	152	17.3	20	111	20.7	22	17.4	17.7
White	88		14	119		13		
Colored	64	(6)	6	97	(6)	9	(6)	(6)
New York	1,423	10.6	131	55	11.2	119	10.7	11.2
Bronx Borough	180	7.3	11	32	8.8	16	7.8	8.2
Brooklyn Borough	492	9.8	47	49	9.5	45	9.7	10.2
Manhattan Borough	554	15.6	55	71	15.7	39	16.0	16.3
Queens Borough	169	8.1	17	68	8.9	16	7.0	7.6
Richmond Borough	28	9.2	1	19	21.0	3	13.9	15.9
Newark, N. J.	106	12.4	8	42	13.0	11	11.9	12.6
Oakland	63	11.5	2	25	12.9	5	11.0	11.3
Oklahoma City	57	16.1	8	144	13.9	4	11.0	10.9
Omaha	40	9.7	6	73	10.5	4	13.5	13.5
Paterson	36	13.6	1	17	12.5	4	12.1	13.3
Philadelphia	512	13.6	55	82	15.3	46	12.5	13.1
Pittsburgh	175	13.6	12	43	17.4	22	13.8	14.8
Portland, Oreg.	61	10.6	4	50	13.4	3	12.2	12.7
Providence	61	12.7	1	9	14.2	5	12.9	14.4
Richmond	62	17.7	3	44	18.0	7	14.8	16.2
White	43		2	44		4		
Colored	19	(6)	1	43	(6)	3	(6)	(6)
Rochester	54	8.6	3	27	10.3	5	11.6	12.3
St. Louis	204	12.9	10	35	13.7	8	14.0	14.6
St. Paul	52	10.0	1	10	13.0	3	10.1	10.5
Salt Lake City [5]	38	14.1	5	79	11.7	5	12.5	13.0
San Antonio	68	13.8	10		15.4	5	14.4	14.6
San Diego	48	16.8	3	63	14.6	2	14.5	15.0
San Francisco	148	12.3	1	7	15.9	7	13.2	13.1
Schenectady	17	9.3	1	31	13.7	2	11.1	12.1
Seattle	76	10.9	3	30	13.5	5	10.9	11.2
Somerville	16	8.0	2	63	7.6	1	9.6	9.2
Spokane	33	14.9	3	78	13.1	2	12.5	12.8
Springfield, Mass.	32	11.1	2	34	11.6	1	12.0	12.6
Syracuse	48	12.1	4	49	14.5	6	11.7	12.9
Tacoma	16	7.8	1	27	12.8	2	12.4	11.8
Toledo	81	14.5	7	64	14.1	8	12.6	13.7
Trenton	58	24.6	4	77	18.3	7	16.7	17.0
Utica	17	8.6	2	56	20.9	4	14.5	15.5
Washington, D. C.	140	15.0	13	76	17.1	13	15.2	15.4
White	91		9	79		6		
Colored	49	(6)	4	71	(6)	7	(6)	(6)
Waterbury	24	12.3	1	24	7.8	1	9.4	9.3
Wilmington, Del. [7]	24	11.9	2	48	12.4	1	14.6	13.9
Worcester	41	10.9	3	42	13.6	3	12.6	12.6
Yonkers	12	4.6	1	24	12.6	3	8.1	9.3
Youngstown	30	9.2	2	29	14.3	6	10.3	12.3

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color the colored population in 1920 constituted the following peacentages of the total population: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indinapolis, 11; Kansas City, Kans., 14; Knoxville, 25; Louisville, 17; Memphis, 38; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930; no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended December 13, 1930, and December 14, 1929

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 13, 1930, and December 14, 1929

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929	Week ended Dec. 13, 1930	Week ended Dec 14, 1929
New England States:								
Maine	4	10	1	8	24	7	0	0
New Hampshire	2	3				28	0	0
Vermont	5	2			11	30	0	0
Massachusetts	93	122	9	11	232	203	2	4
Rhode Island	16	12			2		0	0
Connecticut	17	27	1	4	105	5	3	9
Middle Atlantic States:								
New York [1]	95	185	[2] 13	[2] 24	208	215	17	15
New Jersey	70	129	16	21	118	65	2	6
Pennsylvania	138	165			381	469	3	10
East North Central States:								
Ohio	98	92	25	44	57	549	5	7
Indiana	71	36	2		119	31	4	9
Illinois	179	225	29	24	253	370	11	15
Michigan	81	122	1		89	80	7	12
Wisconsin	17	17	21	23	206	574	3	0
West North Central States:								
Minnesota	15	32			11	248	1	5
Iowa	7	13			5	171	0	0
Missouri	53	74	9	14	554	84	10	11
North Dakota	5	2			5	4	0	5
South Dakota	5				2	4	2	0
Nebraska	15	25			1	149	2	3
Kansas	34	35		6	2	105	2	0
South Atlantic States:								
Delaware	3	5	2			1	0	0
Maryland [3]	40	28	22	43	8	26	1	1
District of Columbia	19	14			3	2	0	2
West Virginia	27	34	32	22	12	20	2	3
North Carolina	89	119	26	28	44	7	3	4
South Carolina	29	49	625	945			4	0
Georgia	52	25	88	122	37	40	1	0
Florida	15	20		12	12	8	0	0
East South Central States:								
Kentucky	17	18				84	1	1
Tennessee	29	22	60	73	51	9	3	1
Alabama	82	45	52	138	148	9	6	2
Mississippi	29	37					1	1

[1] Figures for 1930 are exclusive of Rochester, N. Y.
[2] New York City only.
[3] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 13, 1930, and December 14, 1929—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929
West South Central States:								
Arkansas	12	8	29	88	2	2	0	19
Louisiana	38	53	5	45	3	6	5	3
Oklahoma[4]	52	60	40	101	29	19	0	3
Texas	56	238	53	101	54	21	0	1
Mountain States:								
Montana	2	4				22	0	4
Idaho					5	31	2	0
Wyoming	1	6	6			2	1	0
Colorado	11	17			49	9	3	2
New Mexico	9	40			38	1	0	1
Arizona	4	9	5	10	59	1	3	2
Utah[3]	2	1	8		1	67	2	3
Pacific States:								
Washington	12	15		5	22	22	2	6
Oregon	10	8	17	26	29	21	2	1
California	56	68	50	84	221	315	5	18

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929
New England States:								
Maine	2	0	15	49	0	0	4	1
New Hampshire	0	0	2	12	0	0	0	0
Vermont	0	0	7	11	0	1	1	0
Massachusetts	6	4	236	299	0	0	9	8
Rhode Island	0	0	33	14	0	0	0	1
Connecticut	0	0	59	83	0	0	5	1
Middle Atlantic States:								
New York[1]	4	6	463	357	9	9	24	14
New Jersey	0	1	182	180	0	0	2	6
Pennsylvania	1	1	451	354	0	11	34	13
East North Central States:								
Ohio	11	2	547	383	53	114	23	6
Indiana	1	0	189	148	71	216	4	3
Illinois	5	0	388	617	36	153	27	5
Michigan	3	0	228	16	34	99	13	4
Wisconsin	2	0	121	130	18	41	3	5
West North Central States:								
Minnesota	2	0	71	115	11	15	1	5
Iowa	4	2	53	65	14	140	1	6
Missouri	0	0	93	104	5	22	4	5
North Dakota	0	0	25	45	5	33	1	0
South Dakota	4	0	11	17	12	10	1	0
Nebraska	3	0	38	76	7	72	1	0
Kansas	3	0	51	124	25	52	2	2
South Atlantic States:								
Delaware	0	0	22	7	0	0	0	1
Maryland[3]	0	1	76	79	0	0	9	9
District of Columbia	0	0	29	17	0	0	0	1
West Virginia	0	1	57	78	23	19	15	7
North Carolina	1	0	82	103	1	11	3	5
South Carolina	0	2	20	24	0	1	24	11
Georgia	0	2	49	27	0	0	9	3
Florida	0	0	5	10	1	4	0	5
East South Central States:								
Kentucky	0	0	25	52	8	17	1	3
Tennessee	1	1	51	30	2	8	3	11
Alabama	0	0	86	34	0	5	22	7
Mississippi	0	0	33	23	1	0	10	11

[1] Figures for 1930 are exclusive of Rochester, N. Y.
[3] Week ended Friday.
[4] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

***Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 13, 1930, and December 14, 1929*—Continued**

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929	Week ended Dec. 13, 1930	Week ended Dec. 14, 1929
West South Central States:								
Arkansas	2	0	17	23	0	2	16	10
Louisiana	0	0	13	19	9	1	18	6
Oklahoma [4]	2	0	34	23	21	58	9	15
Texas	3	0	47	114	16	25	6	12
Mountain States:								
Montana	0	0	42	30	14	26	2	6
Idaho	0	0	1	27	1	9	0	0
Wyoming	0	0	21	1	0	9	1	0
Colorado	2	0	62	32	4	13	1	15
New Mexico	1	0	11	9	2	3	16	6
Arizona	0	0	5	1	0	0	4	0
Utah [3]	0	0	6	14	0	1	0	1
Pacific States:								
Washington	1	3	45	37	25	78	5	2
Oregon	1	0	22	39	19	12	4	3
California	15	1	99	382	46	56	4	3

[3] Week ended Friday. [4] Figures for 1930 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Cerebrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October, 1930										
Delaware	--------	6	--------	--------	6	--------	--------	21	0	46
Kansas	3	79	16	1	14	--------	164	203	40	33
Mississippi	9	301	1,000	3,653	73	438	5	169	4	128
November, 1930										
Delaware	1	10	1	--------	4	--------	0	49	0	11
Massachusetts	6	268	13	5	559	1	51	677	0	38
North Dakota	10	47	--------	--------	29	--------	8	80	77	22
Porto Rico	--------	33	45	5,380	20	2	1	--------	0	44
Vermont	0	22	--------	--------	27	--------	0	26	5	2

October, 1930	Cases
Chicken pox:	
Delaware	4
Kansas	155
Mississippi	157
Dengue:	
Mississippi	7
Diarrhea:	
Kansas	1
Dysentery:	
Mississippi (amebic)	47
Mississippi (bacillary)	610
German measles:	
Kansas	1
Hookworm disease:	
Mississippi	217
Impetigo contagiosa:	
Kansas	9
Lethargic encephalitis:	
Kansas	1
Mumps:	
Delaware	12
Kansas	34
Mississippi	119
Ophthalmia neonatorum:	
Mississippi	10
Paratyphoid fever:	
Kansas	4
Puerperal septicemia:	
Mississippi	21
Rabies in animals:	
Mississippi	3
Scabies:	
Delaware	3
Kansas	16
Septic sore throat:	
Kansas	1
Tetanus:	
Kansas	1

	Cases
Trachoma:	
Mississippi	1
Tularaemia:	
Kansas	1
Undulant fever:	
Kansas	7
Vincent's angina:	
Kansas	2
Whooping cough:	
Delaware	5
Kansas	130
Mississippi	341

November, 1930

	Cases
Actinomycosis:	
Massachusetts	1
Anthrax:	
Porto Rico	1
Chicken pox:	
Delaware	13
Massachusetts	1,425
North Dakota	235
Vermont	283
Dysentery:	
Massachusetts	1
Porto Rico	23
Filariasis:	
Porto Rico	8
German measles:	
Massachusetts	62
Lead poisoning:	
Massachusetts	2
Lethargic encephalitis:	
Massachusetts	7
Mumps:	
Delaware	5
Massachusetts	184
North Dakota	84
Porto Rico	12
Vermont	8
Ophthalmia neonatorum:	
Massachusetts	88
Porto Rico	5
Paratyphoid fever:	
Porto Rico	9
Septic sore throat:	
Massachusetts	19
Vermont	1
Tetanus:	
Massachusetts	1
Tetanus (infantile):	
Porto Rico	5
Trachoma:	
Massachusetts	1
North Dakota	2
Trichinosis:	
Massachusetts	2
Undulant fever:	
Vermont	2
Vincent's angina:	
North Dakota	52
Whooping cough:	
Delaware	8
Massachusetts	397
North Dakota	49
Porto Rico	127
Vermont	150

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 31,740,000. The estimated population of the 88 cities reporting deaths is more than 30,145,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended December 6, 1930, and December 7, 1929

	1930	1929	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,673	2,372	
95 cities	562	869	1,106
Measles:			
45 States	2,905	3,166	
95 cities	891	593	
Meningococcus meningitis:			
46 States	105	149	
95 cities	35	59	
Poliomyelitis:			
46 States	108	38	
Scarlet fever:			
46 States	3,910	4,271	
95 cities	1,263	1,519	1,129
Smallpox:			
46 States	619	1,054	
95 cities	44	113	26
Typhoid fever:			
46 States	407	244	
95 cities	63	33	47
Deaths reported			
Influenza and pneumonia:			
88 cities	644	865	
Smallpox:			
88 cities	0	0	

City reports for week ended December 6, 1930

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1921 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	3	1	0		0	0	1	0
New Hampshire:								
Concord	0	0	0		0	0	0	1
Manchester	0	2	0		0	10	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	1	1	0		0	1	0	0
Massachusetts:								
Boston	55	39	27	2	0	59	8	17
Fall River	21	4	2	1	1	0	2	0
Springfield	23	5	0		0	1	4	4
Worcester	37	5	6		0	0	3	1
Rhode Island:								
Pawtucket	5	2	4		0	1	0	0
Providence	15	10	5		0	1	0	2
Connecticut:								
Bridgeport	1	6	2	1	1	0	0	3
Hartford	3	7	4		0	23	1	1
New Haven	2	2	0		0	6	7	1
MIDDLE ATLANTIC								
New York:								
Buffalo	31	19	18		1	11	23	22
New York	191	183	70	7	3	90	30	119
Rochester	16	6	0		0	1	1	1
Syracuse	29	3	0		0	1	0	3
New Jersey:								
Camden	9	7	3		0	46	10	1
Newark	54	23	7	5	0	1	4	5
Trenton	6	4	0		0	0	0	8
Pennsylvania:								
Philadelphia	169	69	16	5	3	23	26	49
Pittsburgh	63	22	14		6	4	8	13
Reading	21	3	0		0	5	34	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	5	14	5		2	12	17	6
Cleveland	183	50	15	7	2	8	43	12
Columbus	13	10	1	1	1	1	0	3
Toledo	135	9	11	1	1	0	15	5
Indiana:								
Fort Wayne	2	5	2		0	1	0	0
Indianapolis	47	11	7		0	3	3	18
South Bend	3	2	2		0	0	0	1
Terre Haute	1	1	0		0	0	0	1
Illinois:								
Chicago	120	143	111	6	3	7	51	46
Springfield	0	1	2	1	0	0	0	0
Michigan:								
Detroit	117	67	34	1	4	8	4	23
Flint	37	3	0		0	3	1	3
Grand Rapids	9	2	0		1	0	0	1
Wisconsin:								
Kenosha	81	2	0		0	0	6	[illegible]
Madison	49	1	2		0	0	23	[illegible]
Milwaukee	138	21	0		0	2	57	[illegible]
Racine	48	4	0		0	0	1	[illegible]
Superior	7	1	1		0	0	0	[illegible]

City reports for week ended December 6, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL								
Minnesota:								
Duluth	12	0	0		0	0	0	2
Minneapolis	89	27	7		2	0	17	13
St. Paul	60	14	3		1	1	1	7
Iowa:								
Davenport	5	1	0			0	0	
Des Moines	1	3	0			0	2	
Sioux City	26	1	1			0	3	
Waterloo	21	0	0			0	0	
Missouri:								
Kansas City	20	10	8		0	2	2	4
St. Joseph	1	2	0		0	0	0	4
St. Louis	55	45	16	1	1	488	6	
North Dakota:								
Fargo	13	0	0		0	0	10	0
Grand Forks	1	0	0			1	4	
South Dakota:								
Aberdeen	1	0	0			0	1	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	12	0	12		0	0	2	7
Kansas:								
Topeka	3	2	4		0	0	1	2
Wichita	15	3	1		0	1	0	5
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	1	0		0	0	0	3
Maryland:								
Baltimore	65	29	10	9	1	3	3	30
Cumberland	0	1	0		0	3	0	0
Frederick	3	1	3		0	0	0	0
District of Columbia:								
Washington	16	20	13	2	2	3	0	12
Virginia:								
Lynchburg	1	3	4		0	0	4	1
Norfolk	0	3	6		0	2	0	0
Richmond	0	13	5		1	10	2	5
Roanoke	12	4	2		1	0	2	2
West Virginia:								
Charleston	4	1	[1] 1	1	1	0	1	2
Wheeling	5	2	1		0	0	0	2
North Carolina:								
Raleigh		2						
Wilmington	13	2	3		0	0	0	3
Winston-Salem	8	3	1		0	0	1	2
South Carolina:								
Charleston	0	0	1	47	1	0	0	4
Columbia	13	1	1		0	1	3	1
Georgia:								
Atlanta	2	7	5	16	2	11	0	7
Brunswick	0	0	0		0	0	0	0
Savannah	0	2	1	15	1	0	0	3
Florida:								
Miami	0	3	0		0	0	0	1
St. Petersburg		0			0			0
Tampa	0	2	5	1	0	0	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	1		0	1	0	3
Tennessee:								
Memphis	26	7	6		1	0	12	5
Nashville	0	3	1		0	0	0	7
Alabama:								
Birmingham	10	6	12	8	1	25	0	7
Mobile	0	3	2		0	0	0	2
Montgomery	2	2	2	1		0	0	

[1] Nonresident.

City reports for week ended December 6, 1930—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	1	0			0	1	
Little Rock	26	2	1		0	0	1	2
Louisiana:								
New Orleans	0	14	10	6	5	2	0	12
Shreveport		1						
Oklahoma:								
Muskogee	3	3	1		0	0	0	0
Oklahoma City	0	4	4	4	1	2	0	7
Tulsa	17	6	3			7	4	
Texas:								
Dallas	5	18	15	2	1	0	1	3
Fort Worth	5	7	4		0	0	0	3
Galveston	0	1	3		0	0	0	1
Houston	3	9	7		2	1	0	6
San Antonio	0	6	4		1	0	2	10
MOUNTAIN								
Montana:								
Billings	1	0	0		0	1	0	0
Great Falls	13	0	0		0	1	0	1
Helena	7	0	0		0	0	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	2	0	0		0	0	0	0
Colorado:								
Denver		10						
Pueblo	0	1	0		1	0	0	2
New Mexico:								
Albuquerque	19	0	0		0	0	0	1
Arizona:								
Phoenix	1	0	1		1	0	0	1
Utah:								
Salt Lake City	32	5	0		1	1	1	5
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	12	5	4	2		1	15	
Spokane	7	2	0			3	0	
Tacoma	8	3	11		0	0	0	0
Oregon:								
Portland	36	11	1		0	5	10	10
Salem	1	0	0		0	0	2	0
California:								
Los Angeles	21	40	14	32	0	6	0	18
Sacramento	6	3	1	1	1	0	9	3
San Francisco	22	16	2	2	0	3	5	3

City reports for week ended December 6, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	3	2	0	0	0	0	0	1	0	17	18
New Hampshire:											
Concord	1	0	0	0	0	1	0	0	0	0	10
Manchester	2	0	0	0	0	0	0	0	0	0	4
Vermont:											
Barre	1	0	0	0	0	0	0	0	0	0	0
Burlington	1	0	0	0	0	0	0	1	0	0	12
Massachusetts:											
Boston	63	50	0	0	0	5	1	2	1	16	176
Fall River	3	2	0	0	0	3	0	0	0	0	22
Springfield	6	3	0	0	0	1	0	0	0	1	35
Worcester	10	22	0	0	0	0	0	0	0	1	41
Rhode Island:											
Pawtucket	2	2	0	0	0	1	0	0	0	0	18
Providence	9	11	0	0	0	4	0	0	0	3	61
Connecticut:											
Bridgeport	7	11	0	0	0	0	0	0	0	2	36
Hartford	6	8	0	0	0	3	0	0	0	3	28
New Haven	4	0	0	0	0	1	0	0	0	3	19
MIDDLE ATLANTIC											
New York:											
Buffalo	26	19	0	0	0	0	1	1	0	21	139
New York	152	133	0	0	0	84	13	10	0	121	1,423
Rochester	6	36	0	0	0	3	1	2	0	13	49
Syracuse	9	12	0	0	0	1	0	0	0	13	48
New Jersey:											
Camden	3	8	0	0	0	0	0	0	0	1	25
Newark	15	8	0	0	0	6	0	1	0	31	109
Trenton	2	8	0	0	0	4	0	1	0	0	58
Pennsylvania:											
Philadelphia	72	115	0	0	0	41	3	2	0	22	512
Pittsburgh	34	50	0	0	0	8	1	0	0	4	175
Reading	3	3	0	0	0	0	0	0	0	1	24
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	15	29	0	0	0	10	1	0	0	0	139
Cleveland	35	56	0	0	0	11	1	4	0	14	183
Columbus	12	10	0	0	0	2	0	2	0	0	75
Toledo	12	5	0	0	0	7	0	0	0	0	81
Indiana:											
Fort Wayne	3	1	0	0	0	2	0	0	0	0	30
Indianapolis	13	43	3	0	0	0	0	1	0	8	
South Bend	4	4	0	0	0	0	0	0	0	3	20
Terre Haute	4	3	0	0	0	0	0	0	0	3	16
Illinois:											
Chicago	110	145	0	0	0	33	2	6	0	38	740
Springfield	3	8	0	0	0	0	0	0	0	0	17
Michigan:											
Detroit	88	77	0	0	0	16	2	1	0	41	257
Flint	13	6	0	0	0	0	0	2	0	3	23
Grand Rapids	9	10	0	1	0	0	0	0	0	2	24
Wisconsin:											
Kenosha	2	4	0	0	0	0	0	0	0	3	7
Madison	1	2	0	0			0	0		0	
Milwaukee	20	10	1	0	0	7	0	0	0	20	136
Racine	6	4	0	0	0	3	0	0	0	1	14
Superior	3	4	0	0	0	2	0	0	0	5	14
WEST NORTH CENTRAL											
Minnesota:											
Duluth	9	1	0	0	0	0	0	0	0	6	28
Minneapolis	48	12	0	0	0	2	0	1	1	6	102
St. Paul	25	8	2	0	0	2	1	0	0	18	59
Iowa:											
Davenport	1	0	1	1			0	0		0	
Des Moines	11	5	1	5			0	0		0	28
Sioux City	2	4	1	0			0	0		0	
Waterloo	2	0	0	0			0	0		0	

City reports for week ended December 6, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—Con.											
Missouri:											
Kansas City	14	12	0	0	0	4	0	0	1	5	77
St. Joseph	2	3	1	0	0	0	0	0	0	0	25
St. Louis	30	46	1	0	0	7	2	1	0	14	204
North Dakota:											
Fargo	3	4	0	0	0	0	0	0	0	1	5
Grand Forks	0	0	0	0			0	0		0	
South Dakota:											
Aberdeen	1	0	0	0			0	0		0	
Sioux Falls	0	0	0	1			0	1		0	7
Nebraska:											
Omaha	6	11	2	18	0	1	0	1	0	3	40
Kansas:											
Topeka	3	1	0	0	0	0	0	0	0	0	13
Wichita	5	0	0	7	0	1	0	0	0	0	37
SOUTH ATLANTIC											
Delaware:											
Wilmington	6	4	0	0	0	1	0	0	0	0	24
Maryland:											
Baltimore	25	26	0	0	0	10	2	2	0	10	243
Cumberland	1	4	0	0	0	0	0	0	0	0	8
Frederick	1	2	0	0	0	0	1	0	0	0	2
District of Col.:											
Washington	20	19	0	0	0	7	1	0	0	3	140
Virginia:											
Lynchburg	2	3	0	0	0	1	0	1	0	0	11
Norfolk	2	2	0	0	0	0	0	0	0	0	
Richmond	7	10	0	0	0	5	1	0	0	8	56
Roanoke	3	4	0	0	0	0	1	0	0	0	18
West Virginia:											
Charleston	2	0	0	0	0	1	0	2	1	0	26
Wheeling	2	2	0	0	0	0	1	0	0	0	21
North Carolina:											
Raleigh	0		0				0				
Wilmington	0	0	0	0	0	0	0	0	0	3	14
Winston-Salem	3	5	0	0	0	0	0	0	0	0	23
South Carolina:											
Charleston	1	1	0	0	0	2	1	0	0	0	25
Columbia	0	3	1	0	0	1	0	0	0	0	11
Georgia:											
Atlanta	6	28	1	0	0	6	0	0	0	6	70
Brunswick	0	0	0	0	0	0	0	0	0	0	5
Savannah	1	3	0	0	0	4		3	0	0	34
Florida:											
Miami	2	7	0	0	0	1	0	0	0	0	28
St. Petersburg	0		0		0	1	0		0		11
Tampa	0	0	1	0	0	1	0	1	1	0	30
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	8	0	0	0	1	0	0	1	0	21
Tennessee:											
Memphis	6	14	0	0	0	8	1	1	0	1	74
Nashville	3	3	0	0	0	4	1	1	0	1	43
Alabama:											
Birmingham	4	22	1	0	0	3	1	0	0	0	78
Mobile	0	2	0	0	0	2	0	0	0	0	22
Montgomery	0	1	0	0			0	0		0	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0			0	0		0	
Little Rock	2	3	0	0	0	3	1	0	0	0	
Louisiana:											
New Orleans	8	10	0	0	0	9	2	2	1	5	152
Shreveport	2		0				1				

City reports for week ended December 6, 1930—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL—continued											
Oklahoma:											
Muskogee	1	0	0	0	0	0	0	2	0	0	--------
Oklahoma City	3	8	0	2	0	3	0	0	0	0	57
Tulsa	3	13	0	1	--------	--------	0	0	--------	0	--------
Texas:											
Dallas	8	6	0	0	0	2	0	3	0	2	54
Fort Worth	2	1	0	0	0	2	0	0	0	0	50
Galveston	0	0	0	0	0	1	1	2	1	0	14
Houston	3	3	1	1	0	5	0	0	0	0	76
San Antonio	2	3	0	0	0	5	0	0	0	0	68
MOUNTAIN											
Montana:											
Billings	1	1	0	12	0	1	0	0	1	9	5
Great Falls	2	4	0	0	0	0	0	0	0	7	5
Helena	1	1	0	0	0	0	0	0	0	0	7
Missoula	2	0	1	0	0	0	0	0	0	0	2
Idaho:											
Boise	1	0	0	0	0	0	0	0	0	4	7
Colorado:											
Denver	13	--------	0	--------	--------	--------	0	--------	--------	--------	--------
Pueblo	1	0	0	0	0	2	0	0	0	0	16
New Mexico:											
Albuquerque	1	1	0	0	0	2	0	1	0	3	7
Arizona:											
Phoenix	2	0	0	1	0	4	0	0	0	0	18
Utah:											
Salt Lake City	4	1	0	0	0	1	0	1	0	14	38
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	5
PACIFIC											
Washington:											
Seattle	9	21	1	0	--------	--------	0	1	--------	17	--------
Spokane	9	4	4	4	--------	--------	0	0	--------	0	--------
Tacoma	5	1	3	1	0	1	0	0	0	1	16
Oregon:											
Portland	8	3	5	1	0	1	1	1	0	0	61
Salem	0	1	0	0	0	0	0	0	0	1	--------
California:											
Los Angeles	33	15	1	0	0	15	1	2	0	15	273
Sacramento	3	0	0	0	0	0	0	1	0	1	24
San Francisco	16	7	0	0	0	8	1	1	1	17	165

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	2	0	1	0	0	0	1	6	1
MIDDLE ATLANTIC									
New York:									
New York [1]	10	1	1	2	0	0	2	3	0
Syracuse	1	0	0	0	0	0	0	0	0
New Jersey:									
Newark	0	1	1	0	0	0	1	0	0
Pennsylvania:									
Philadelphia	2	1	1	1	0	0	0	2	0
Pittsburgh	1	1	0	1	0	0	0	0	0

[1] Typhus fever: 7 cases and 1 death; 1 case at New York, N. Y.; 1 case and 1 death at Atlanta, Ga. 4 cases at Savannah, Ga.; and 1 case at Miami, Fla.

City reports for week ended December 6, 1930—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	0	0	0	0	1	0
Cleveland	0	1	0	0	0	0	0	1	0
Columbus	1	0	0	0	0	0	0	1	0
Indiana:									
Indianapolis	1	0	0	0	0	0	0	0	0
Illinois:									
Chicago	1	1	0	1	0	0	0	3	0
Michigan:									
Detroit	3	0	0	0	0	0	0	2	0
Flint	0	0	0	0	0	1	0	0	0
Wisconsin:									
Milwaukee	0	0	0	0	0	0	0	2	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	0	0	0	0	0	0	1	0
Missouri:									
Kansas City	0	0	0	0	0	1	0	0	0
St. Louis	1	1	0	1	0	0	0	0	0
Nebraska:									
Omaha	2	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	0	0	0	0	0	0	1	0
North Carolina:									
Winston-Salem	0	1	0	0	0	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	3	0	0	0	0
Georgia: [1]									
Atlanta [1]	1	1	0	0	1	1	0	0	0
Florida:									
Miami [1]	0	0	1	0	0	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	2	3	0	0	1	0	0	0	0
Alabama:									
Birmingham	0	2	0	0	0	2	0	0	0
Mobile	0	0	0	1	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	2	0	0	0	0	0	0	0
Oklahoma:									
Tulsa	1	0	0	0	0	0	0	0	0
Texas:									
Dallas	0	1	0	0	3	3	1	0	1
Fort Worth	0	0	0	0	0	0	0	1	0
MOUNTAIN									
Arizona:									
Phoenix	1	0	0	0	0	0	0	0	0
Utah:									
Salt Lake	2	0	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles	0	0	0	0	0	0	1	0	1
Sacramento	1	0	0	0	1	0	0	1	0
San Francisco	2	1	0	0	1	0	0	2	3

[1] Typhus fever: 7 cases and 1 death; 1 case at New York, N. Y.; 1 case and 1 death at Atlanta, Ga.; 4 cases at Savannah, Ga.; and 1 case at Miami, Fla.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended December 6, 1930, compared with those for a like period ended December 7, 1929. The population figures used in computing the rates are approximate estimates, authoritative figures for many of the cities not being available. The 98 cities reporting cases have an estimated aggregate population of more than 32,000,000. The 91 cities reporting deaths have more than 30,500,000 estimated population.

Summary of weekly reports from cities November 2 to December 6, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929
98 cities	[2] 84	156	91	159	102	[3] 186	89	139	[4] 92	146
New England	78	110	75	168	113	117	80	177	111	112
Middle Atlantic	35	104	46	112	54	123	50	123	61	110
East North Central	110	195	130	205	125	302	123	167	113	191
West North Central	[2] 75	200	104	165	108	169	108	114	99	121
South Atlantic	79	125	110	122	141	135	60	144	[5] 104	127
East South Central	243	219	209	232	310	239	155	157	162	226
West South Central	213	480	172	427	183	446	164	259	[6] 159	362
Mountain	120	61	26	44	26	[3] 89	77	17	[7] 0	157
Pacific	109	97	73	84	73	60	111	56	76	84

MEASLES CASE RATES

	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929
98 cities	[2] 60	44	93	56	129	[3] 72	109	74	[4] 146	98
New England	117	20	157	45	164	56	148	70	202	81
Middle Atlantic	35	20	71	26	80	34	73	33	89	54
East North Central	16	68	17	91	31	94	28	101	28	93
West North Central	[2] 275	94	491	50	751	81	636	100	933	216
South Atlantic	44	9	24	7	59	24	40	22	[5] 57	4
East South Central	94	7	20	14	169	14	74	0	175	14
West South Central	0	4	0	19	4	27	11	38	[6] 12	46
Mountain	223	61	300	252	318	[3] 107	275	131	[7] 51	165
Pacific	28	113	38	142	33	280	12	249	31	377

SCARLET FEVER CASE RATES

	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929
98 cities	[2] 173	191	191	205	200	[3] 218	178	212	[4] 207	252
New England	206	276	253	265	217	249	241	258	246	276
Middle Atlantic	140	102	133	135	168	127	156	116	187	148
East North Central	234	295	290	311	266	347	224	361	259	409
West North Central	[2] 137	187	140	139	214	223	137	183	194	231
South Atlantic	145	167	141	238	198	163	172	139	[5] 211	159
East South Central	331	178	310	157	236	157	243	137	337	144
West South Central	97	152	127	152	101	156	142	118	[6] 100	156
Mountain	275	357	378	226	275	[3] 267	223	348	[7] 120	392
Pacific	111	176	116	179	102	261	97	266	113	355

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimates as of July 1, 1930, and 1929, respectively.
[2] Waterloo, Iowa, not included.
[3] Reno, Nev., not included.
[4] Raleigh, N. C., Shreveport, La., and Denver, Colo., not included.
[5] Raleigh, N. C., not included.
[6] Shreveport, La., not included.
[7] Denver, Colo., not included.

Summary of weekly reports from cities November 2 to December 6, 1930—Annual rates per 100,000 population, compared with rates for the corresponding period of 1929—Continued.

SMALLPOX CASE RATES

	Week ended—									
	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929
98 cities	[2] 2	9	4	13	3	[3] 24	8	14	[4] 7	19
New England	0	2	0	25	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	4	15	2	22	0	33	4	13	1	25
West North Central	[2] 6	29	21	42	33	50	66	48	47	64
South Atlantic	0	0	0	0	0	2	0	0	[5] 0	0
East South Central	0	0	0	0	0	0	0	0	0	0
West South Central	7	8	4	4	4	38	4	11	[6] 4	19
Mountain	9	17	0	9	43	[3] 71	34	35	[7] 205	78
Pacific	7	19	21	31	7	111	9	75	12	60

TYPHOID FEVER CASE RATES

	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929
98 cities	[2] 11	9	15	8	15	[3] 13	10	5	[4] 10	5
New England	4	11	22	22	15	11	11	2	7	2
Middle Atlantic	5	8	4	3	5	10	3	2	8	4
East North Central	9	6	5	6	9	9	4	5	10	4
West North Central	[2] 4	12	19	4	23	12	8	6	6	2
South Atlantic	29	13	31	9	26	19	29	4	[5] 17	6
East South Central	27	21	54	14	13	34	13	34	13	48
West South Central	30	11	93	8	90	34	75	15	[6] 28	0
Mountain	17	17	26	44	51	[3] 36	9	26	[7] 17	26
Pacific	19	7	12	10	12	5	7	2	12	10

INFLUENZA DEATH RATES

	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929
91 cities	9	8	10	9	11	[3] 8	9	11	[4] 10	17
New England	2	4	4	9	7	4	2	4	4	11
Middle Atlantic	13	8	9	4	8	9	11	5	6	14
East North Central	6	8	9	9	5	6	7	10	8	9
West North Central	3	3	6	3	6	9	0	21	12	27
South Atlantic	9	4	5	11	22	4	9	17	[5] 19	28
East South Central	29	37	44	22	15	30	29	15	15	60
West South Central	15	12	31	31	38	16	15	55	[6] 37	47
Mountain	9	0	9	26	60	[3] 9	26	17	[7] 34	17
Pacific	9	16	6	9	9	6	9	13	3	13

PNEUMONIA DEATH RATES

	Nov. 8, 1930	Nov. 9, 1929	Nov. 15, 1930	Nov. 16, 1929	Nov. 22, 1930	Nov. 23, 1929	Nov. 29, 1930	Nov. 30, 1929	Dec. 6, 1930	Dec. 7, 1929
91 cities	104	105	118	98	119	[3] 101	112	106	[4] 102	136
New England	82	119	104	88	115	88	71	92	66	74
Middle Atlantic	122	115	136	103	140	106	125	101	107	139
East North Central	75	78	86	71	83	96	78	84	78	126
West North Central	86	108	77	120	136	102	92	126	130	126
South Atlantic	139	137	157	107	143	94	165	120	[5] 143	131
East South Central	155	90	214	231	199	254	155	224	177	239
West South Central	119	125	111	121	123	129	165	156	[6] 139	238
Mountain	189	131	215	157	163	[3] 107	223	157	[7] 137	165
Pacific	52	72	83	85	61	28	86	104	74	138

[2] Waterloo, Iowa, not included.
[3] Reno, Nev., not included.
[4] Raleigh, N. C., Shreveport, La., and Denver, Colo., not included.
[5] Raleigh, N. C., not included.
[6] Shreveport, La., not included.
[7] Denver, Colo., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended December 6, 1930.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended December 6, 1930, as follows:

Province	Cerebro-spinal meningitis	Influenza	Polio-myelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		9			
New Brunswick					2
Quebec	1	2			16
Ontario	2	13	6	3	18
Manitoba					1
Saskatchewan				16	2
Alberta					1
British Columbia			1	1	5
Total	3	24	7	20	45

[1] No case of any disease included in the table was reported during the week.

Ontario Province—Communicable diseases—Five weeks ended November 29, 1930.—During the five weeks ended November 29, 1930, and the corresponding weeks of the year 1929, certain communicable diseases were reported in the Province of Ontario, Canada, as follows:

Disease	5 weeks, 1929		5 weeks, 1930	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	8	4	2	2
Chancroid			3	
Chicken pox	2,065		1,365	
Conjunctivitis	1			
Diphtheria	500	20	159	17
Goiter			1	
Dysentery				5
Erysipelas			1	
German measles	66		31	
Gonorrhoea	217		501	
Influenza	8		12	
Lethargic encephalitis	1	1	1	
Measles	636	2	105	
Mumps	59		595	
Paratyphoid fever	2		5	
Pneumonia		141		153
Poliomyelitis	30	1	80	11
Puerperal septicemia		2		
Scarlet fever	656	4	621	1
Septic sore throat	5		6	1
Smallpox [1]	55		62	
Syphilis	231		354	
Tetanus		1		1
Tuberculosis	131	51	209	51
Typhoid fever	92	3	73	8
Undulant fever			5	
Whooping cough	421	3	370	1

[1] The cases of smallpox were distributed as follows: Ottawa, 35; Trafalgar, 13; Toronto, 8; Kingston, 3; Percy, 2; Rama, 1.

Quebec Province—Communicable diseases—Week ended December 6, 1930.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended December 6, 1930, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	88
Chicken pox	115	Paratyphoid fever	1
Diphtheria	74	Scarlet fever	112
Erysipelas	4	Tuberculosis	65
German measles	2	Typhoid fever	16
Influenza	2	Whooping cough	59
Measles	79		

DENMARK

Communicable diseases—September, 1930.—During the month of September, 1930, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	4	Poliomyelitis	22
Chicken pox	9	Puerperal fever	19
Diphtheria and croup	377	Scabies	729
Erysipelas	298	Scarlet fever	174
Influenza	4,014	Tetanus	5
Lethargic encephalitis	13	Typhoid fever	9
Measles	550	Undulant fever (Bac. abort. Bang)	53
Mumps	271	Whooping cough	1,297
Paratyphoid fever	8		

GREAT BRITAIN

England and Wales—Vital statistics—July–September, 1930.—During the third quarter of the year 1930, 165,768 births and 96,400 deaths were registered in England and Wales, giving a birth rate on an annual basis of 16.5 per 1,000 population and a death rate of 9.6 per 1,000. The figures are provisional. The mortality of infants under 1 year of age was 45 per 1,000 live births.

Deaths from certain communicable diseases were reported in 158 smaller towns for the quarter ended September 30, 1930, as follows:

Disease	Deaths	Disease	Deaths
Diarrhea and enteritis (under 2 years)	95	Scarlet fever	13
Diphtheria	52	Typhoid fever	5
Influenza	63	Whooping cough	28
Measles	34		

During the 13 weeks ended September 27, 1930, deaths from certain communicable diseases were reported in 107 county boroughs and great towns, including Greater London, as follows:

Disease	Number of deaths	Death rate per 1,000 population	Disease	Number of deaths	Death rate per 1,000 population
Diarrhea and enteritis (under 2 years)	649		Scarlet fever	66	0.01
Diphtheria	366	0.07	Smallpox	2	
Influenza	194	.04	Typhoid fever	30	
Measles	164	.03	Whooping cough	160	.03

England and Wales—Communicable diseases—Thirteen weeks ended September 27, 1930.—During the 13 weeks ended September 27, 1930, cases of certain communicable diseases were reported in England and Wales, as follows:

Disease	Cases	Disease	Cases
Diphtheria	14,739	Puerperal pyrexia	1,301
Ophthalmia neonatorum	1,365	Scarlet fever	21,539
Pneumonia	6,075	Smallpox	1,292
Puerperal fever	583	Typhoid fever	1,036

Scotland—Vital statistics—Quarter ended September 30, 1930.—The Registrar General of Scotland has published the following statistics for the third quarter of the year 1930:

Population, estimated	4,879,700	Deaths from—Continued.	
Births	22,951	Lethargic encephalitis	34
Birth rate per 1,000 population	18.7	Malaria	3
Deaths	13,353	Measles	66
Death rate per 1,000 population	10.9	Nephritis (acute)	38
Marriages	9,532	Nephritis (chronic)	413
Deaths under 1 year	1,358	Paratyphoid fever	8
Deaths under 1 year per 1,000 births	59	Pneumonia	416
Deaths from—		Poliomyelitis	7
Bronchitis	451	Puerperal sepsis	49
Broncho-pneumonia	332	Scarlet fever	26
Cerebrospinal meningitis	43	Syphilis	31
Diabetes	127	Tetanus	5
Diphtheria	72	Tuberculosis (pulmonary)	664
Erysipelas	33	Tuberculosis (other forms)	275
Heart disease	1,921	Typhoid fever	8
Influenza	73	Whooping cough	93

PANAMA CANAL ZONE

Communicable diseases—October, 1930.—During the month of October, 1930, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	1		Mumps	2	
Chicken pox	33		Paratyphoid fever	1	
Diphtheria	25		Pneumonia		27
Dysentery (amebic)	7		Tuberculosis		25
Leprosy	3	1	Typhoid fever	5	
Malaria	123	3	Whooping cough	8	
Measles	6				

TRINIDAD (BRITISH WEST INDIES)

Port of Spain—Vital statistics—October, 1929 and 1930.—The following statistics for the month of October, 1929 and 1930, are taken from a report issued by the Public Health Department of Port of Spain, Trinidad:

	October	
	1929	1930
Number of births	162	201
Birth rate per 1,000 population	28.7	35.1
Number of deaths	123	96
Death rate per 1,000 population	21.8	16.8
Deaths under 1 year	25	14
Infant mortality rate per 1,000 births	154.3	69.6

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	October, 1930: 11	October, 1930: 18	October, 1930: 25	November, 1930: 1	November, 1930: 8	November, 1930: 15	November, 1930: 22	November, 1930: 29	December, 1930: 6	December, 1930: 13
Afghanistan	C		[1] P	P													
China:																	
Amoy	C				2												
	D				2												
Canton	C	2	2				1			1							
	D		1														
Shanghai	C				34	23	5	6	4	1		1					
	D				3	2			2								
Shensi Province	C				P												
Swatow	C	7		3	2												
Tientsin	C			2	1												
India	C	37,162	26,121	42,893	51,551	11,109	10,172										
	D	25,711	13,822	22,358	23,959	5,225	4,808										
Bassein	C				1												
Bombay	C			14	1	1	3	1	11	17	1	1		2	2		
	D			8	2	1	2		8	10	6	1		2	1		
Calcutta	C	327	220	63	27	4	4	7	9	7	7	11		4			
	D	179	128	30	12	3	4	4	4	4	2	6		4			
Madras	C			1				2			1						
	D			1				2									
Negapatam	C	1															
	D	1															
Rangoon	C	6	1	1	2			1									
	D	4	1	1	1			1									
Tuticorin	C								1				1	4			
	D								1				1				
India (French):																	
Chandernagor	C	3	1		1		1	2									
	D	2					1										
Karikal	C	3															
	D	3															

Pondicherry	C							1						1			
	D							1						1			
India (Portuguese)	C			1	1						3						
Indo-China (see also table below):																	
Pnompenh	C	40	32	11		1		1		1						1	
	D	18	22	6												1	
Saigon and Cholon	C	48	10	5		1	1			1					1		
	D	23	3	1											1		
Philippine Islands: [2]																	
Ports—																	
Cebu	C	1	65	9	2												
	D		36	8	2												
Iloilo	C		29	64	10	1									1		
	D		22	56	14	2			2						3		
Manila	C			1	43	2	1	2									
	D				12		1										
Provinces—																	
Antique	C			20	47	12		28									
	D			12	34	8		10									
Bohol	C			138	49												
	D			79	20												
Bulacan	C	3	4	1	4		2										
	D	1			2		1										
Capiz	C		3	2	1												
	D		2	2													
Cebu	C	355	713	85	25												
	D	170	303	50	11												
Iloilo	C	2	309	571	238	18	7	13	12	10	10	4	6	11	21	13	
	D	1	193	376	151	15	6	7	12	7	7	3	6	8	11	8	
La Union	C		1														
Leyte	C	47	1														
	D	19	11														
Masbate	C	10	92	34													
	D	3	35	14													
Misamis, Occidental	C		3														
	D		3														
Negros, Occidental	C	140	568	343	122	8	10	5	5	12	3	19	22	44	38	48	33
	D	88	368	237	91	6	5	6	3	12	3	12	14	33	17	45	28
Negros, Oriental	C		23	8													
	D		13	4													
Nueva Acija	C		1														
	D		1														
Pampanga	C	2	2		1												
Pangasinan	C		3	1													
	D		2	1													
Rizal	C	1	1														
	D											4					
Samar	C			18	4	4			3	6	3	4	3	4	4		
	D			16	2	4			3	5	1	4	2	4	4		
Sorsogon	C											5					
	D	1	1									4					

[1] An outbreak of cholera was reported in June, 1930, in Afghanistan.

[2] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	October, 1930: 11	October, 1930: 18	October, 1930: 25	November, 1930: 1	November, 1930: 8	November, 1930: 15	November, 1930: 22	November, 1930: 29	December, 1930: 6	December, 1930: 13
Philippine Islands—Continued.																	
Provinces—Continued.																	
Surigao	C			28	1	([2])											
	D			17	2												
Tarlac	C			1													
Siam	C	27	20	3				1	3	3		1			1		
	D	19	9	2					1	3		1					
Bangkok	C	12	8	1				1	2	1	2			2	1		
	D	5	3	1				1	1	1	1			2	1		
Songkla	C		10														
	D		6														
On vessel:																	
S. S. Malwa from Shanghai	D				1												
On small boat at Port Cebu, from Bantayan Island	C	1															
	D	1															

Place		May, 1930	June, 1930	July, 1930	August, 1930: 1-10	August, 1930: 11-20	August, 1930: 21-31	September, 1930: 1-10	September, 1930: 11-20	September, 1930: 21-30	October, 1930: 1-10	October, 1930: 11-20	October, 1930: 21-31	November, 1930: 1-10	November, 1930: 11-20
Indo-China (French) (see also table above):															
Annam [1]	C	23	16	1		3									
Cambodia [1]	C	88	144	43	37	22		23	13	2	16		6		1
Cochin-China [1]	C	671	273	46	22	5		9	6	18	14	6	8		5

[1] Reports incomplete.
[2] During the period from Aug. 24 to Sept. 26, 1930, 26 cases of cholera with 17 deaths were reported in Manitum, Surigao Province, P. I.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 23 1930	July 27-Aug. 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	December, 1930: 6	13
Algeria:																	
Algiers	C		3	7	11	1	1	2	2	5	3	1	2			1	
	D									3							
Constantine	C	1	1									1					
Oran	C		3	4	10		4	4	2	1			1				
	D				1			2	1								
Plague-infected rats			2		10	2			4	1							
Philippeville	C				1	1		1	1	1		1					
Argentina: Cordoba Province—Chazon	C																1
Belgian Congo	C		2	2	5								1				
	D		2	2	3												
British East Africa (see also table below): Uganda	C	406	228	236	202	65	18	32	50	53							
	D	323	213	229	191	65	18	32	49	53							
Canary Islands: Las Palmas	D			1													
Ceylon:																	
Colombo	C	1	3	2	2	1	1		1				1	1			
	D	1	3	2	3	1	1		1				1	1			
Plague-infected rats		1	1										1	1	1		
China:																	
Manchuria—Tungliau and Nungan	C			30	29	2											
Shensi	C				P					P							
Dutch East Indies:																	
Batavia and West Java	C	98	84	83	79	22	14	26	45	41							
	D	98	84	83	76	22	14	26	41	42							
Plague-infected rats		4		1	3												
Java and Madura	D	202	217	188	260	75	65	95	97	124	140						
Ecuador (see table below).																	
Egypt:																	
Alexandria	C	19	23	11	[illegible]	2	1	3	3	2	1	1	3		1		2
	D	9	10	6	8	3	1	1	1	3		2	2				1
Assiout	C	9	2									3			2		7
	D	3	2									1					1
Aswan	C														3		
Beni-Suef	C			1													
Dakahlieh	C	1															
Gharbieh	C			3													
	D			1													

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930: 4	11	18	25	November, 1930: 1	8	15	22	29	December, 1930: 6	13
Egypt—Continued.																	
Girga	C		1		1												
Minieh	C	10	3														
	D	1															1
Port Said	C	2	1	1						1	1						
France:																	
Marseille	C				5				4	2	1		1				
St. Ouen	C		1														
	D		1														
Gambia	C			4													
	D			4													
Greece (see also table below):																	
Patras	C	1	1														
Pyrgos	C						2										
Hawaii Territory, Hamakua, Hawaii: Plague-infected rats		1															
India	C	240	377	877	2,497	672	527										
	D	187	256	477	1,132	289	222										
Bassein	C				2						1						
	D				3												
Bombay	C	3	1		1	1			1	1							
	D	2	1		1		1		1		1						
Plague-infected rats		26	52	35	47	21	13	16	14	2	9	11	8	11	5		
Madras Presidency	C	39	47	81	127	41	59	46	50	69							
	D	22	31	34	57	14	32	31	33	43							
Rangoon	C	1	2	3	10	2					1		1				
	D	1	2	2	9	2					1						
Plague-infected rats		1	6	7	8		1			1				1	1		
India (Portuguese)	D			P							3						
Indo-China (see also table below):																	
Pnompenh	C	6	2	4	3	1	1							1	3	1	
	D	7	2			1	1	1		1				1	3	1	
Saigon and Cholon	C	2		1	1	1											
	D	1															
Iraq: Baghdad	C	28	18	9		1											
	D	15	7	3		1											
Kwang-Chow-Wan	C	31	4	1													
Madagascar (see also table below): Tamatave	C	1	1	2	1		1			3		2					
	D						1			3							

Morocco	C	3	1	15						4		1					
	D	4		2													
Nigeria: Lagos	C	5	1	7	6		3		2	33	1	2	2	4			
	D	5	1	7	6		3		2		1	2	2	4			
Plague-infected rats		11	18	8	10				11	3	1	2					
Senegal (see table below).																	
Siam	C			7	3			1		3	1	1					
	D			6	2					3	1						
Bangkok	C			3													
	D			2													
Nagara Rajsima	C			2	1				1				1				
	D			2	1				1				1				
Syria: Beirut	C	12	9	2	5					1	1	3	1				
Tripolitania	C			2										4	6		
Tunisia:																	
Sfax district	C	9	6	1													
Tunis	C	1	5								1		1				
	D	1	1														
Union of Socialist Soviet Republics:																	
Salsk Region	C	2	5	7													
	D	1	4	5													
Stavropol Region	C	1															
	D	1															
Union of South Africa:																	
Capo Province	C	1	1	1	1					1							
	D		1	1	1												
Orange Free State	C				2												
	D				2												

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	107	97	87	53	50
Ecuador: Guayaquil	C	0	0				
	D	0	0				
Plague-infected rats		0	0				
Greece (see also table above)	C		1				
Indo-China (see also table above)	C		11	1	2	4	
Madagascar (see also table above):							
Ambositra Province	C	1					
	D	1					
Antsirabe Province	C	19	3	24	11	21	
	D	19	3	24	11	21	
Miarinarivo Province	C	5	1	1	2	7	
	D	5	1	1	2	7	
Moramanga Province	C	1	3		27	18	
	D		3		27	17	

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
Madagascar (see also table above)—Con.							
Tananarive Province	C	15	16	28	39	79	
	D	14	16	28	38	79	
Senegal:							
Baol [1]	C	13	2	62	79	48	53
	D	11	2	48	20	23	35
Dakar [1]	C	52	53	140	108	3	
	D	42	117	122	90	8	
Louga [1]	C	54	60	138	75	61	37
	D	27	21	103	33	30	25
Thies [1]	C	21	52	54	34	12	24
	D	8	35	30	20	4	15
Tivaouane [1]	C	135	43	119	110	20	53
	D	69	28	70	54	14	31

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Aug. 24-Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930 4	October, 1930 11	October, 1930 18	October, 1930 25	November, 1930 1	November, 1930 8	November, 1930 15	November, 1930 22	November, 1930 29	December, 1930 6	December, 1930 13
Algeria:																	
Algiers	C		1	3													
Constantine	C	1	1									1					
Arabia: Aden	C		1														
Brazil: Rio de Janeiro	C											2					
British East Africa (see also table below):																	
Tanganyika	C	1,610	168	242	522	27	43	4	21	3	1						
	D	301	42	37	60	1		1	4	1							
British South Africa: Southern Rhodesia	C	79	31	1	1	14	39	98	2	2	54						
Canada:																	
Alberta	C		5	1	1		13	8	1					1			
British Columbia—Vancouver	C	2	6	6	2	1			1		3						
Manitoba	C	4			1												
Ontario	C	47	24	20	10	1		3	15		20	9		7	12		
Ottawa	C	15	13	7	5					14		9	14		8	1	1
Toronto	C	4	1		1										2	2	
Quebec	C	4	3	5										1			
Montreal	C			7													
Saskatchewan	C	22	5	8	1		3				2			2			
China:																	
Changking	C	1	P	P	P	P	P	P	P	P	P	P					
Foochow	C	P	P	P	P		P				P		P				
Hong Kong	C	4	2														
	D	3	1														
Manchuria—																	
Harbin	C	4	3	2													
Kwantung—Dairen	C	16	8											1			
	D	1															
Nanking	C	P	P	P	P	P	P	P	P	P	P	P					
Shanghai—																	
Foreigners only	C	5	4	3	18				1	1		1					
Including natives	D	3			2								1				
Swatow	D	4	1	4	2	1			3	1	1		1	1			
Tientsin	C					1											

Chosen (see table below).																	
Colombia:																	
Barranquilla	C			2													
Buenaventura	C	6	10	2													
Cali	D						1		1								
Costa Rica: Port Limon	C	2															
Curacao (alastrim)	C	1	2	1													
Dutch East Indies:																	
Borneo	C	12	2														
	D	1															
Java—																	
Batavia and West Java	C	13	8	12	11	10	2	1	1	2	13						
	D	3	5	5	4	1	1	1	1	2	1						
East Java and Madura	C		1														
Sanggi Islands	C		11	36	14					29							
	D		3	2	3					3							
Egypt: Port Said	C		3														
France (see table below).																	
Great Britain:																	
England and Wales	C	926	529	344	341	82	74	44	125	86	87	92	107	116	160		
Ashton under Lyne	C	7	8														
Bradford	C		1				1	1	1	1	1						
Cardiff	C		2							1							
Leeds	C		1							1			2				
London	C	498	250	178	164	30	34	23	33	29	32	41	47	52	67		
London and Great Towns	C	753	408	285	268	55	56	32	80	52	58	68	82	88	136		
	D							1			1						
Stoke-on-Trent	C	32	9	2	2			1			1						
Scotland	C	4	1		5												
	D		1														
Honduras: Naco	C				5												
India	C	12, 962	7, 630	4, 877	3, 131	611	528										
	D	3, 531	2, 348	1, 246	680	202	122										
Bombay	C	113	50	12	6			1									
	D	79	33	10	5												
Calcutta	C	161	73	25	14	3	4	3	2	2	4	3		3			
	D	146	56	21	9	3	4	3	1	2	2	3		3			
Cochin	C	16	6	14	3			8	4	3	5	10	7	4	5		
	D	4			1			1		1			2	2			
Karachi	C	7	1	4	4									2			
	D	3		3	2										1		
Madras	C	35	49	38	34	4	4	8	3	2	1	2	4	3	5		
	D	10	12	11	6	1	2	3	2			2					
Moulmein	C	21	18	2	1												
	D	7	1	1	1												
Negapatam	C	2	4	4	9	4	2	5	3	2	2	2	3	3			
Rangoon	C	9		3					2			5			1		
	D	2															
Tuticorin	C	1							1								
Vizagapatam	C	1						1									

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		June 1–28, 1930	June 29–July 26, 1930	July 27–Aug. 23, 1930	Aug. 24–Sept. 20, 1930	Week ended— Sept. 27, 1930	October, 1930 4	October, 1930 11	October, 1930 18	October, 1930 25	November, 1930 1	November, 1930 8	November, 1930 15	November, 1930 22	November, 1930 29	December 1930 6	December 1930 13
India (French):																	
Chandernagor	C	19	4		3			3			3						
	D	3	3		2			1			1						
Karikal	C	11	2	9	5	1											
	D	8	2	9	2	1											
Pondicherry Province	C	23	26	22	35	11	10	6	11	2	2						
	D	23	25	22	33	11	8	6	11	2	2						
India (Portuguese)	C	28	1	9	4												
	D	10	1	2													
Indo-China (see also table below):																	
Pnompenh	C		1					2							1		
	D	1	1	1											1		
and Cholon	C	1		1	1						2			2	1		
	D			3	1						2			1			
ad	C	1	3	1	1		2										
	D		1	1													
al Liwa	C	4	67			63		4	2			6		7	9		
	D	1	20			27								1	1		
t (see table below).																	
e also table below):																	
(State) Guadalajara	D	15	4	1			2		1	1		1	1	1		2	
	C	6		2													
	D	1		1		1				1							
City and surrounding territory	C	77	37	10	12	1	3	5	4	1	3		2	1			
	D	17	8	6	5			1	2	1							
so	D	1															
ruz	C										1						
see table below).																	
agos	C	1															
	C	2								2	3			1			
	C	10	13	50	27	4	5		7	12			8	11			
	C			1													

Siam	C		6				1										
	D		3														
Somaliland, British: Boales	C						1					1					
	D						1										
Spain	C	12	5	2	5					14	5	11	21				
Straits Settlements	C	9	11	8	6	1	1	1	2	3	3	4		3	9		
	D	2	3	3	1			1			1	1		1	2		
Sudan (Anglo-Egyptian)	C	67	12	42	128	25	1	56		3			2		3		47
	D	3	1	3	52	2		5					1				
Sudan (French) (see table below).																	
Switzerland: Berne Canton	C		1	2		1											
Syria (see table below).																	
Tunisia: Tunis	C	2	1		2												
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C		P		P			P	P	P	P						
Orange Free State	C		P	P							1	1					
Transvaal	C			P	P	P		P	P	P	P						
Upper Volta	C	13															
On vessel: S. S. Manoa, from Honolulu to San Francisco	C		1														

Place		May, 1930	June, 1930	July, 1930	August, 1930			September, 1930			October, 1930		
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (see also table above)	C	305	213	238	59	34		54	52	86	32	62	164
Ivory Coast	C												4
Sudan (French)	C	274	76	34			39		P			17	
	D	32	18				3					2	
Syria: Beirut	C	7	7	2	1								

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
British East Africa (see also table above):							
Kenya	C	171	142	186		424	
Uganda	C	78					
	D	69					
Chosen	C	107		3	2		
	D	35					
Seishin	C	2	1	2			
	D	1					

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
France	C	51		1			
Mexico: Durango (see also table above)	D	4	3	3	3	2	
Morocco	C	13	5	3	8	1	4
Turkey	C	16					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		June 1-28, 1930	June 29-July 26, 1930	July 27-Aug. 23, 1930	Week ended— Aug. 30, 1930	September, 1930 6	13	20	27	October, 1930 4	11	18	25	November, 1930 1	8	15	22	29
Algeria:																		
Algiers	C	3	6	2		3									1			
Constantine Department	C	12	2	3						2			1					
Oran	C	4	3	1	1						1	2						
Bulgaria	C	16	10	1		2	2		2		1	3			1	2		
	D	1	1															
China:																		
Manchuria—Harbin (see also table below)	C	8	2	2	2							1						
Shanghai	C			1														
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	1	1	1		1	1	1	1							2		1
Beheira Province	C	45	15					1										
	D	4	2															
Cairo	C			7	1		1											
Port Said	C			4		1				1			1	1				
Great Britain: Scotland—Dunfermline	C		1															
Greece (see table below).																		
Ireland:																		
Irish Free State—																		
Galway County—Oughterard	C		2															
Leitrim County—Mohill	C	9	1															
Mayo County—																		
Ballina	C	1	1															
Castlebar	C			1														
Westport	C		2	1														
Roscommon County—																		
Roscommon	C		1															
Strokestown	C		1															
Wicklow County—Shillelagh	C	4	2															
Latvia (see table below).																		
Lithuania (see table below).																		

Mexico:																		
Durango	D							1	1		1							
Mexico City, including municipalities in Federal District	C	9	5	9	2	2	3				3	5	1	1		4	1	
	D	1		2		1	1				2		1				2	
Morocco	C	15	11	8		2							1		1	1		
	[illegible]											1						
Palestine	D	2	6	3		1	1	1	[illegible]	1	1	1			2	1	1	6
Poland	C	117	36	34	2	3	6	12	[illegible]	6	6	7	7	8	15	7	12	
	D	11	4	3		1			[illegible]			1					1	
Portugal: Oporto	C			1					[illegible]	1		1		2	1	1	2	2
Rumania	C	58	28	9	1		1	2	[illegible]	4	1	6	4	13	10			
	D	5	8	2											1			
Spain	C	3	3				1				1	1			4			
	D		1				1				1	1						
Tunisia	C	18	24	10	1	1		4	1	1	1	9					5	
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P				
Municipality of East London	C		1					2			1							
Natal	C	P	1	P			P			P	P	2	P	P				
Orange Free State	C	P	P	P	P	P	P	P										
Transvaal	C		P	P	P	P	P	P	P	P	P	P	P	P				
Yugoslavia (see table below).																		

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
China: Harbin (see also table above)	C	240		14	5		
Chosen: Seoul	C	43	2	3	2	1	
Czechoslovakia	C	12	1		1		
Greece: Athens	C	3	3	6	6	4	2
Latvia	C	3	3	3	1	2	

Place		May, 1930	June, 1930	July, 1930	Aug., 1930	Sept., 1930	Oct., 1930
Lithuania	C	27	15	18	7	24	1
	D				1	2	
Turkey	C	16	2	7	2		
Yugoslavia	C	16	6				
	D	1					

YELLOW FEVER

	Cases
Brazil:	
Campos, Rio de Janeiro Province, May 23, 1930	1
Para, June 23, 1930	2

	Cases
Gold coast:	
July 10, 1930	1
Albosso, Aug. 5, 1930 (deaths)	1
Liberia, Monrovia, June 3, 1930	1
Nigeria, Lagos, July 12, 1930 (probably laboratory infection)	

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